LINE UP

SEPTEMBER 1988

PISTOL GRIP ON LOCATION

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The Journal of the Institute of Broadcast Sound

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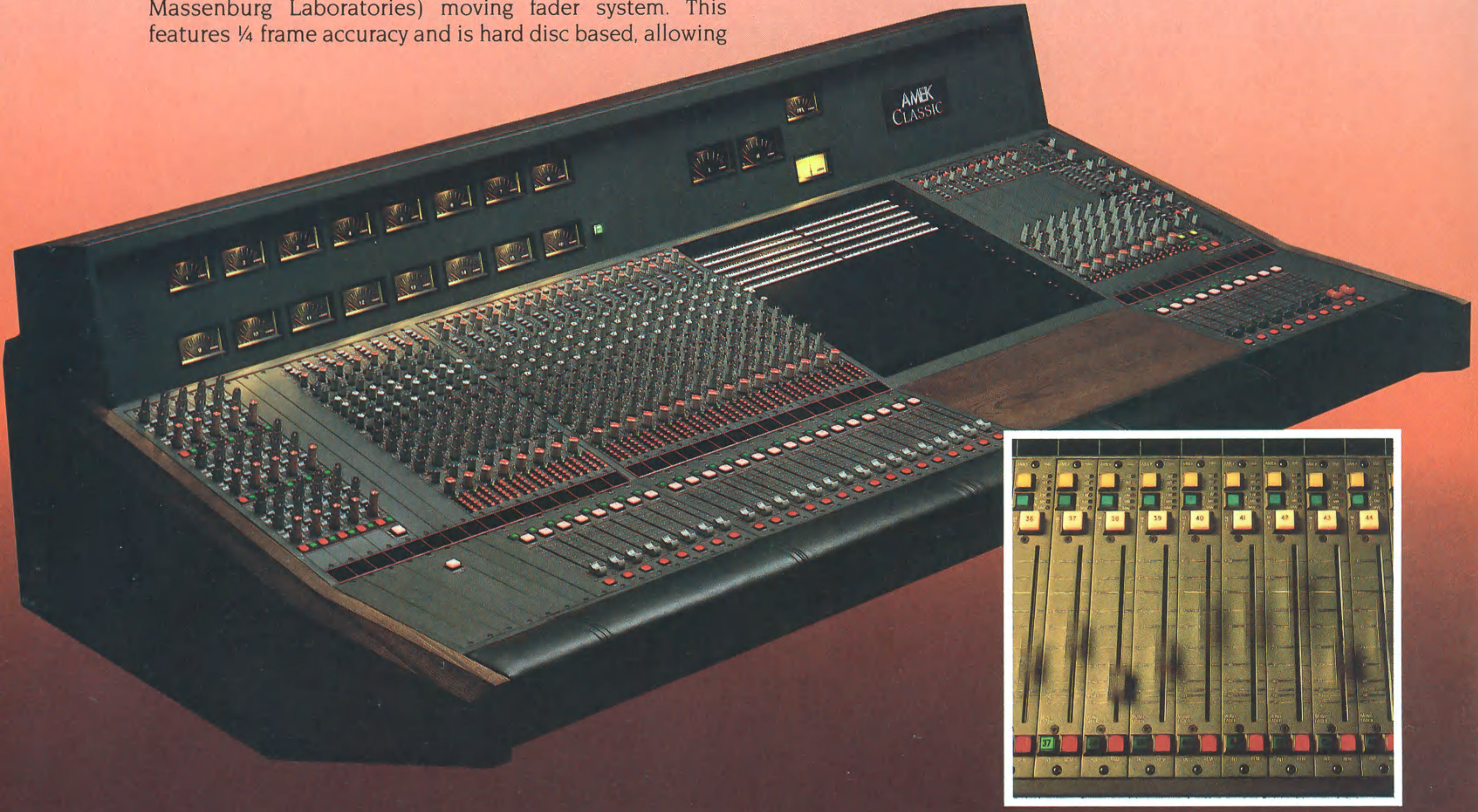

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LINE UP

CONTENTS

September 1988 Volume 1 No 3

Editor
Fergal Ringrose

Editorial Assistant
Rachel Miller

Contributors
Alan Avery
Adrian Bishop-Laggett
Martin Gifford
Peter Hunt
Jonah Jones
Norman McLeod
Steve Terepin
Peter Wisbey
Mark Yonge

Publisher
Michael Crimp

Advertisement Manager
Colin Birch

Advertisement Sales
Kerr Duffy

Publications Manager
Candida Goulden

Publications Assistant
Nicola Paisey

Designer
Hugo Lamb

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Line Up provides information, debate and comment about the art and science of broadcast sound and related topics. As such, opinions expressed are those of the author and not necessarily those of the editor, the IBS, or BSO Publications Ltd.

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Editorial address: Line Up, 27 Old Gloucester Street, London
WC1N 3XX.
Tel: 01 878 3118

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BSO Publications Ltd, 3/5 St John Street, London EC1M 4AE.
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Fax: 01-251 2359

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Welcome 5
Peter Wisbey, IBS Chairman, introduces the third issue of Line Up with a tribute to the late Alastair Askham, Deputy Chairman of the IBS.

News 7
Tablet audio editor for BBC; D.I.E. focuses on future audio trends; Neve to launch new broadcast console; DASH enhanced; Synclavier makes on-air debut in the U.S.; the IBA awards dual channel tv sound contract.

An R-DAT for a soft head 12
Martin Gifford describes his trip to Switzerland with a brass band and the Sony PCM-2000 portable recorder, with which the first binaural, totally digital recorded, edited and transmitted - from - DAT programme was made. But what he really needed was a pair of ear muffs!

Bowen A'i Bartner 24
Peter Hunt and Jonah Jones report on the recording in stereo of one episode of this S4C thriller series. Not an easy task when the pub you're filming in is full of genuine clientele, not just extras.

MADI - the multichannel interface 35
Steve Terepin has followed the progress of the group of companies who are proposing a standard for the serial transfer of digital audio data between different multichannel machines.

Dear Mr Sound Recordist 44
Alan Avery, film editor, requests some help from, and offers a little advice to, sound recordists.

Aircheck 49
A temporary transmitting station at the Thamesmead Show broadcast the first legitimate FM radio programme, outside the BBC or IBA. Norman McLeod was there to switch on the transmitter.

Blumlein looking at stereo 51
Mark Yonge looks back on the early work of Alan Blumlein in stereo - he was finding answers before others understood the questions.

Products 54
Fairlight MFX; Kintek convertor; new Beyer gun mic; Focusrite dynamics processor; mic processor from Orban; Broadcast Electronics enters on-air console market; Audio Technica mixer.

Some quotes to make you think hard (disc).

"We've just completed our first film for Cannon Films completely on AudioFile without reverting to mag stock in post production. We can't see anybody wanting to work the old way once they've worked on AudioFile."
Vic & Linda Radulich,
Digital Post, Los Angeles.

"When we took delivery of our AudioFile, we got it out of the box, powered it up, and did a project with it, it really is that simple."
John Wiggins,
HBO Productions, New York City

"Client response to disk based recording and editing has been nothing short of phenomenal. They have realised the AudioFile's time saving during their first session, and for them saving time means saving money. What this means to the Chicago Recording Company is that the AudioFile has helped the busiest room in town to get even busier."
Hank Newberger, & Tim Butler
Chicago Recording Company, Chicago

"On our latest film, 'Lords of Magic', we recorded all of our production sound digitally. The AudioFile is used to handle the dialogue and music editing and will be used as a playback source in the final mix."
David Marsh,
Marsh Films, Los Angeles.

"Over the years we've built up a very comprehensive digital audio effects library and we're now building two complete new rooms, each equipped with an AudioFile to get the very best results when laying audio to picture."
Wylie Stateman & Lon Bender,
Soundelux, Los Angeles.

"We own a lot of AMS equipment, and all of us at the Hit Factory are very excited about the addition of AudioFile to the Studio. Right now, our clients are eagerly awaiting the arrival of our first system."
Eddy Germano
Hit Factory, New York City

"Commercial production forms the bulk of our business. The AudioFile has proven to be easy to use and now makes it possible for us to realise our goal of digital audio from start to finish."
Jay Scott,
Producers Color Service, Detroit.

"The AudioFile has eliminated the need for our analog 24-track in post work. Recording and editing entirely in the digital domain makes possible first generation audio for our final video mix. This has allowed us to maintain our leading edge as one of the top audio for video facilities in the world."
John Binder,
Editel, Chicago.

"You can build a house with a hand saw or a power saw; AudioFile gives you the advantage of using a power saw – it's so fast it can actually make a repetitive chore fun!"
Ken Hahn,
Sync Sound, New York City

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welcome

The news of the death of our Deputy Chairman, Alastair Askham, came as a great shock to everyone. Alastair had been Deputy Chairman since the executive committee first began, and I know that at times, he felt he was taking the easy option in not becoming Chairman. In fact, he was a loyal and active committee member who put as much into the IBS as he got out, and he was a stabilising source of continuity during periods of committee change.

Two memories of Alastair stand out for me. Firstly, he was a fierce advocate for the upholding of standards in his profession, and he was always concerned that the IBS should be seen to be playing a major role in that field. Secondly, he was very keen to encourage more regional involvement in the management of the Institute; a view shared by the current executive committee.

In the coming season, we want to widen the foundations of the organisation so that what sometimes appears to be a London-based structure is tempered by more regional autonomy, with local groups in Cardiff or Birmingham or wherever, holding their own meetings. However, the idea will only take off if the membership outside London is prepared to became actively involved in recruitment and arranging local meetings. We can give as much financial and organisational support as possible, but it's going to be down to the members on the ground to make it work. It would be a fitting memorial to Alastair Askham if 1988/1989 saw the Institute of Broadcast Sound become a truly international body.

Peter Wisbey

Chairman IBS

Magazine Committee

Richard Cobourne, Roger Derry, Peter Dorey,
Keir Polyblank, Mark Yonge.

Keir Polyblank, Head of Sound at TVS Southampton, replaces
the late Alastair Askham on the Magazine Committee

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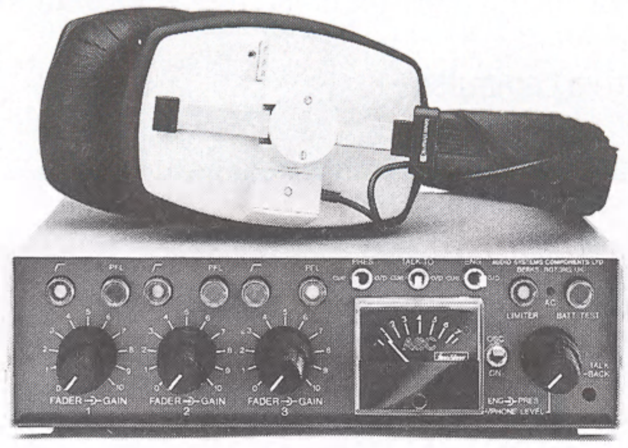

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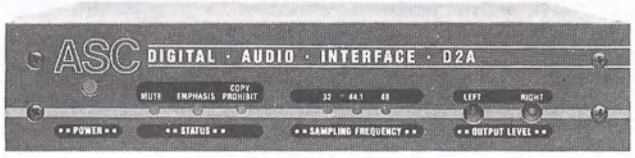

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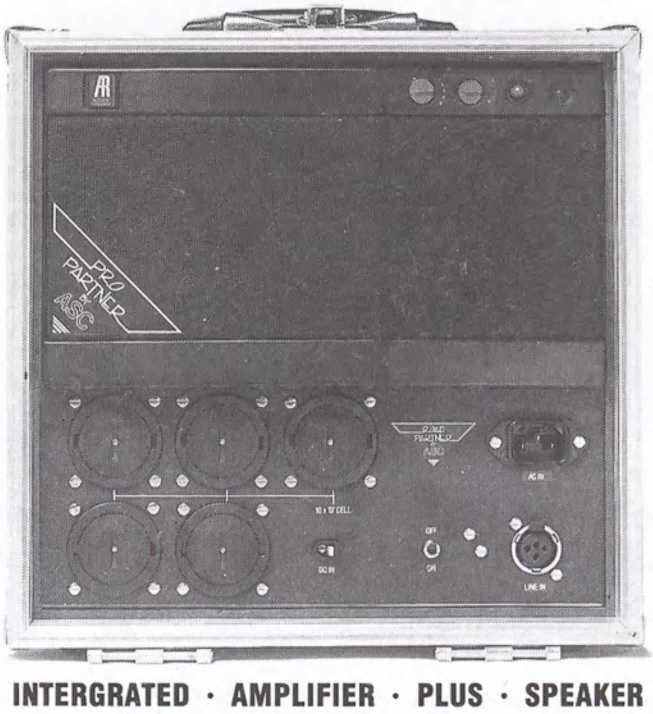

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Make contact for the full facts by return.

Pro/Road Partner

BBC-backed audio editor for IBC exhibition

Dr Bruce Moffat, Head of the BBC's Engineering Research Department at Kingswood Warren, recently signed a co-operative agreement with Real World Research of Bath, covering the development of hardware and software for the newly launched Tablet random access audio editor.

The joint results of the co-operative venture in the form of an enhanced random access digital editor will be on show at the BBC Engineering stand in Brighton (L12, Metropole).

Six Tablet editors were scheduled for delivery to BBC Radio's Broadcasting House and Maida Vale studios during late July and August, by RWR dealers Syco. The new editors will be used across the whole range of radio programmes and, says Simon Shute, General Manager, Operations and Engineering, Radio, "...come closer to our vision of what ought to be achieved than anything else we have seen."

The research agreement consolidates on Kingswood Warren's expertise in random access editing techniques for broadcast, first publicly demonstrated at IBC 86, and Dr Moffat commented, "...will pull our research ideas through into a product range which I believe will be attractive to broadcasters and recording studios as they develop digital systems."

Neve to launch new broadcast console at IBC and SBES shows

Audio manufacturer Neve will be exhibiting a "completely new design of broadcast console" at IBC and then the SBES in Birmingham (Albany Hotel, 11 October). The new 66 Series range is designed specifically to fulfil the requirements of radio and television broadcasting and production. The series combines Neve analogue circuitry - including the Formant Spectrum Equaliser - with the latest techniques in digital control technology to provide a range of consoles with a choice of mono or stereo input modules and up to 12 stereo groups, and having 24 or 32 track recording and post- production options.

All 66 Series consoles have an integral computer controlled reset system for switch status and input gain, with an optional recall system for all other rotary controls and faders.

***Ed. note:** Readers who are IBS members will find a ticket for SBES inserted in this issue of Line Up. Other readers interested in attending the show can request tickets from organiser Dave McVittie of Point Promotions on Wallingford (0491) 38575.*

Enhancements for DASH format

The proponents of the Digital Audio Stationary Head (DASH) recording format - Sony, Studer and Teac - reaffirmed their commitment to the digital audio standard at the APRS show at the end of June.

Teac announced its intention to display its prototype DASH 24 channel recorder before the end of this year. The recorder is entirely based on Teac technology, with the exception of DASH devices such as heads and LSI which were developed in common by all DASH companies.

Sony announced the introduction of the PCM-3324A, an enhanced version of its DASH 24 channel PCM-3324. Sony and Studer further announced their intentions to market 48 channel DASH recorders before the end of this year. The 48 track format will use the same half-inch tape as the 24, but will squeeze the extra tracks between the existing ones.

IN BRIEF

In early August **Soundcraft** announced a management buy-out of its tape machine manufacturing subsidiary, Soundcraft Magnetics. The new company, **Saturn Research Ltd**, will be headed by Magnetics' Steve Buchanan, Cliff Lawrence and Jenny Street, all of whom were involved in the development of the Saturn 24 track tape machine. The split appears amicable, as Soundcraft strategy involves focusing on the console market - Soundcraft will continue sales and service for Saturn Research.

Rupert Neve's 'new' company, Focusrite, has delivered its first 32 bus console, into Master Rock Studios London. Focusrite developed a new VCA in house for the console's dynamics section, which offers low distortion level and absence of modulation noise.

Chris Daubney, formerly one of the IBA's assistant directors of engineering, is joining **Channel 4** as its new Chief Engineer. His deputy is to be Martin Connelly, who has been with 4 since it started. Daubney was with the IBA from 1973, first as Head of Quality Control, and then as Head of Engineering Information Service.

Cardiff will host the first **British Animation Awards** ceremony and dinner on November 28, at the Holiday Inn. The awards, which will cover the full range of animation skills and techniques, will also include categories for best and most humorous scripts, music quality and animation in commercials. An estimated 2,000 people are involved in the industry, which generates some £20 million annually in turnover.

Audio post house **Videosonics** has ordered a customised **Trident** 80 VP console. The Trident will be configured to deal with Videosonics' television post production requirements, kitted out with extras including a centre section containing an AMS Audiofile, and all push buttons will be gold plated, it says here...

First Synclavier on air in USA

At the NAB exhibition in April, New England Digital declared its intention to push into the on-air broadcasting arena with its Synclavier Digital Audio System, which is well established in the pro-audio and audio-for-video post production worlds. NED believes there is a market for the Synclavier in on-air radio operations. Pictured above is KIIS-FM, Los Angeles, the first USA station to incorporate Synclavier into its production and on-air operations. KIIS-FM and NED personnel are creating on-air promotional announcements, using the Synclavier.

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The new Sanken CMS-9 and CMS-7 are unlike any other stereo microphones.

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*A weighted rms [IEC 179] [OdB=$2x10^{-5}$Pa]

Dual channel tv sound contract awarded

In keeping with the IBA's plans to introduce stereo sound on its terrestrial tv networks to more than 70 per cent of the UK population by the end of 1990, the Authority has awarded RE Instruments of Berkshire the contract for the supply of distribution equipment for dual channel sound in both the ITV and Fourth Channel networks.

The new system will use the existing video distribution network for distributing the dual sound channels with a dual sound-in-sync (DSIS) technique.

The equipment provides a solution to the network demands ensuring optimum audio quality and network ruggedness without the need of transcoding digital formats.

The new equipment consists of: NICAM encoders for coding two audio channels into the NICAM 728 kBit format; DSIS encoders and decoders for distributing the 728 kBit digital signal; transmitter input equipment to supply a APSK (Quadrature Phase Shift Keying) signal for modulating the tv transmitters with the 728 kBit signal; NICAM 728 kBit decoders for studio use and for derivation of a mono signal for modulation of the normal mono sound carrier of the tv transmitter.

Future audio trends at Digital Information Exchange

It may not be an IBS event, but it's still worth considering!

The fourth Digital Information Exchange (DIE) to take place 22, 23 and 24 November at the Private Suite in London Zoo, brings together many big names to discuss mid to long term trends in digital audio. As with previous years the first day of the forum is devoted to 'Digital audio in broadcast, film and video' - the second and third days concentrating on studio recording.

For Day One this year organiser Nick Hopewell-Smith has lined up Neil Gilchrist of BBC Research, to talk about stereo tv transmission technology, followed by a review from Mike Bennett (Sony Broadcast) on the speed with which Eastern European broadcasters are now adapting to the latest technology - 'increasingly ahead of their Western counterparts.' John Watkinson will discuss DVTR technology, followed by Quantel's Bill Aitken on Harrysound. Other papers will concern film-making with digital audio in Los Angeles, and Genesis in concert shot on High Definition video with digital audio sound. Key names for Days Two and Three include Dr Roger Lagadec, Carl Schofield, Cary Fisher, Roger Cameron and Peter Billington. Further information can be obtained from Nick Hopewell-Smith, DIE, PO Box 46, London SW6 7BU, or telephone 01-381 1991.

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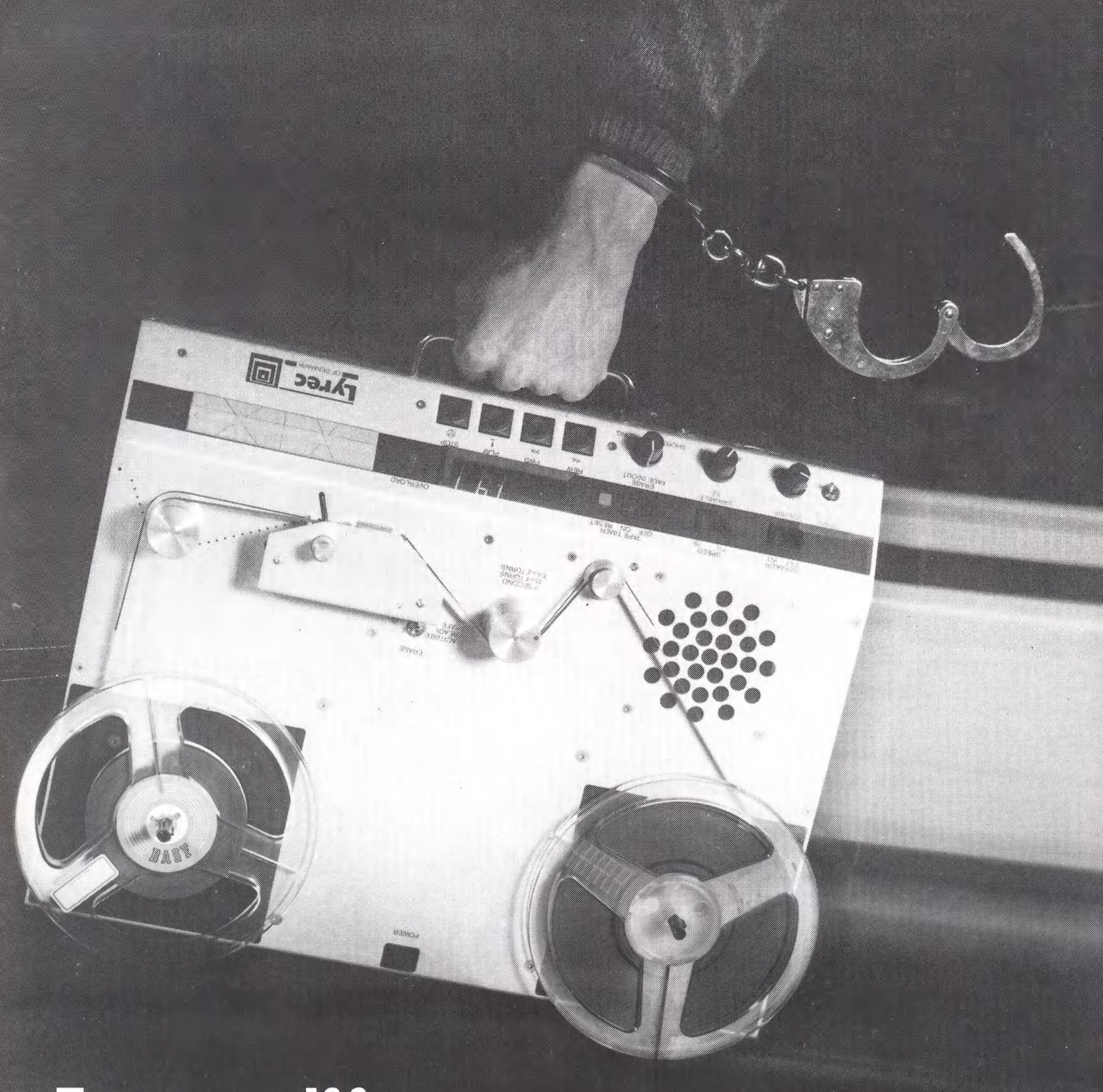

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EVENTS

Compiled by
Adrian Bishop-Laggett

September
23-27 IBC '88
Metropole Conference and Exhibition Centre, Brighton

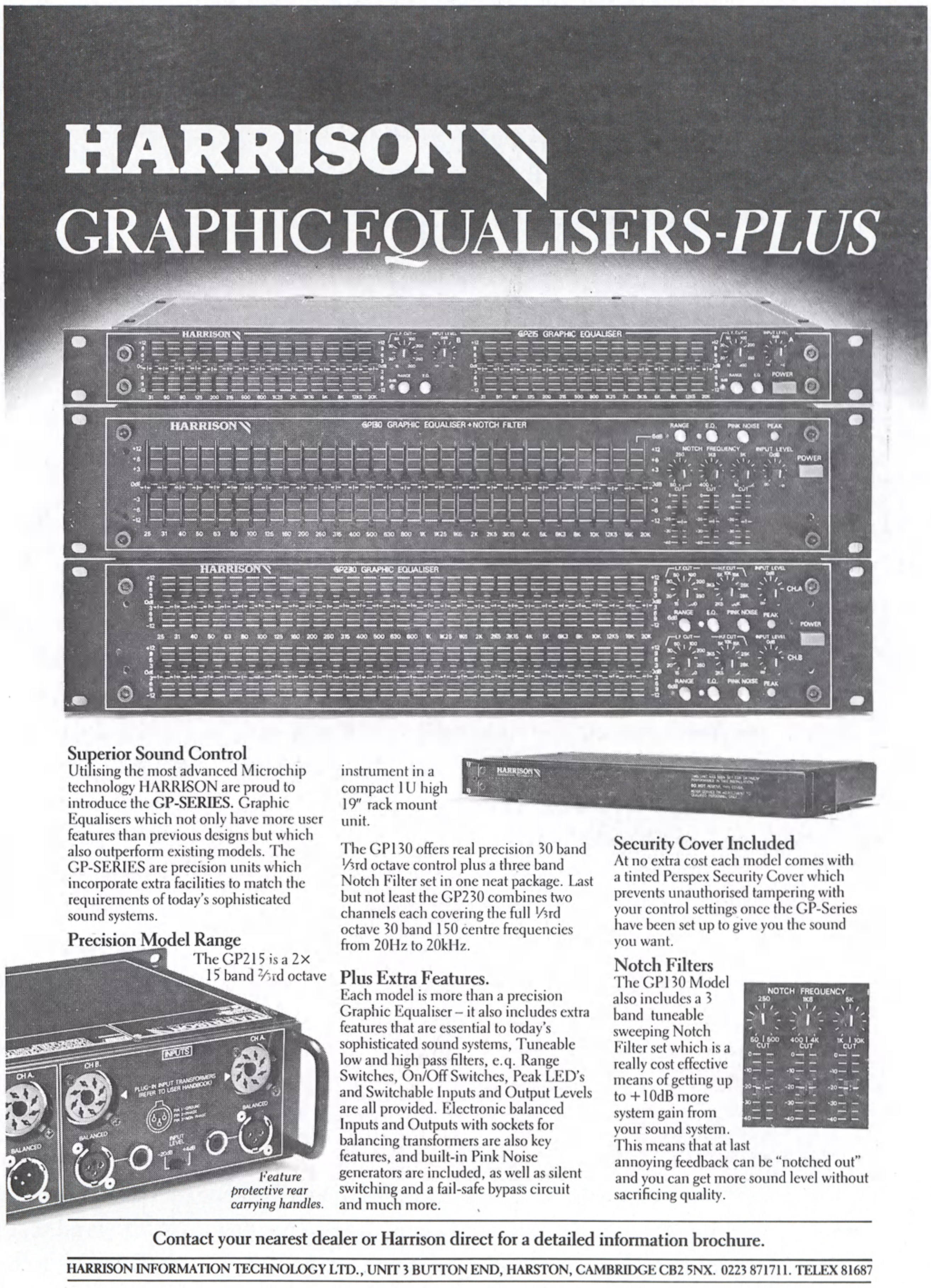
September
28 White City.
London Weekend Television are our hosts for the first meeting of the new season when Richard Wright, the Head of Sound Operations for News and Current Affairs Department looks at the advanced plans for the new BBC radio and television joint development at White City. This is the first major broadcast complex in London to be designed from scratch by the BBC since the Television Centre was built in the late 'fifties. At the rate with which techniques and technology are changing, the project promises to be a challenging one.

Come and share the current thinking!

October
11 SBES, Albany hotel, Birmingham.
Readers who are IBS members will find a ticket for the SBES enclosed in this issue of Line Up. Other readers who are interested in attending this Sound Broadcasting Equipment Show can request tickets from organiser Dave McVittie of Point Promotions, on Wallingford (0491) 38575. Address to write to: Point Promotions, PO Box 46, Wallingford, Oxon OX10 0XP

October
20 The Olympics.
With Moscow, Sarajevo, Los Angeles, Mexico and Calgary behind them, Mike Giles, John Howell and their colleagues know a few wrinkles when it comes to getting the show on the air under difficult conditions. At a meeting to be held in Central TV, Birmingham, they give an inside account of the BBC coverage of the 1988 Olympic Games in Seoul, Korea.

November
23 Radio Data System.
Bev Marks, RDS Project Manager, and Mark Sanders, RDS Development Manager, explain the many powerful features of RDS, which is to be launched at the Radio Show on 30 September and could have far reaching implications for the future of radio.



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Contact your nearest dealer or Harrison direct for a detailed information brochure.

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An R-DAT for a soft head

The first people in Europe to use a portable DAT machine to make a programme were Martin Gifford, Robert Coles, Des Bennet and Peter Jeffreys of BBC Wales. The first binaural totally digitally recorded, edited and transmitted - from - DAT programme concerned the European Brass Band Championship, held in Lucerne. Martin Gifford describes the 'very steep learning curve' involved in testing, recording, editing - and transmitting - the DAT first, and also relates the singular joy of travelling to Switzerland in a coach with a rumbustuous brass band...

"What sort of portable recorder do you suggest I take to Switzerland for a binaural recording?"said unsuspecting music producer Robert Coles, during a music editing session. The usual list tripped off my tongue finishing with, "but what you really need is me and a portable digital recorder." Imagine my surprise when he took me seriously!

At that time (February), portable DAT machines were something very few people had heard about, let alone seen. To me, it was something that I thought must be available, but I knew not where from. The very next day I chanced to pick up a trade handout and there it was - a number, no photograph or details - just Sony PCM-2000, portable recorder.

Next stop was Assistant Audio Manager Roger Derry, who knows practically everyone in the pro-audio business. He contacted Clive Lorton of Sony Broadcast and the deal was made to loan us the machine for an extended period of trials. This made us the first people in Europe to use a portable DAT machine to make a programme.

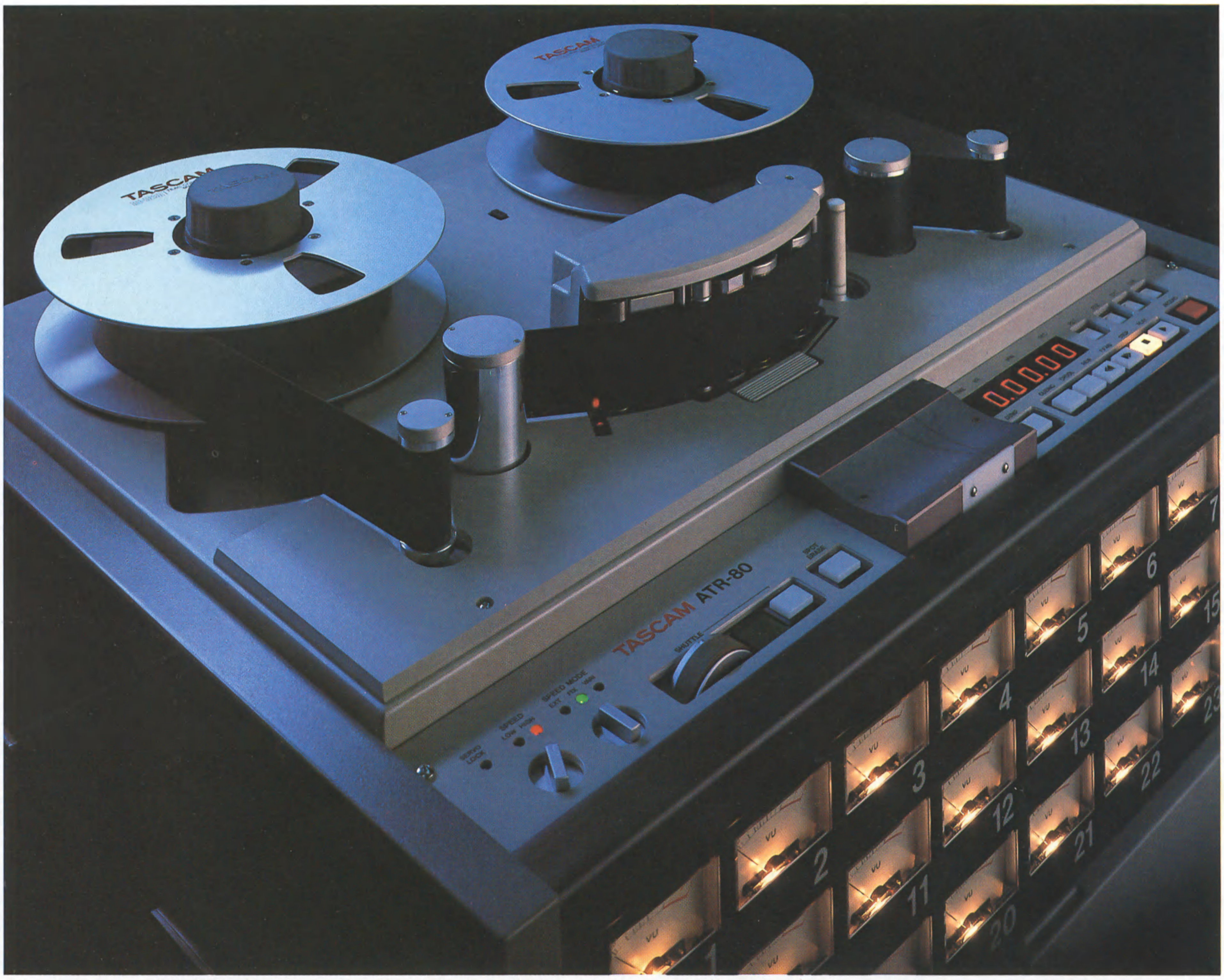
Bob's inevitable question, "how do we edit it?" was easily answered. One of the Cardiff dubbing theatres is equipped with AudioFile, and a phone call to the dubbing mixer in charge of Stacey Road, Des Bennet, proved he was as daft as us, when he said he would be very interested in the project. The proposal was now clear - the programme would be recorded on portable DAT, edited in the digital domain on AudioFile and transmitted from the portable machine in a Cardiff continuity. All these digits deserved a very high quality front end and I chose B+K 4000 series Omni mics mounted on a home-made perspex head. This mic set up has become a part of my basic recording kit, as the binaural/stereo/mono compatability is, in my opinion, more satisfactory than any other arrangement I have heard.

My mega Walkman

Back-up equipment was necessary and F1 was chosen as it had the advantage (apart from being digital) that it shared the same rechargeable battery packs and therefore kept the total weight down.

During April, the recorder arrived and I connected everything together and paraded myself around the building with my mega Walkman. Initially I was dismayed to find that apparently it was susceptible to shock as it swung on my shoulder. Eventually I found, not a failing in the machine, but rather that the combination of flat frequency response from mics and the recorder were reacting to doors opening and closing many metres away and thus changing momentarily the local air pressure. The cure was to insert the high pass filter marked music and we were in business.

Our trip to Lucerne to record the experiences of the Parc and Dare (National Fuel Distributors) Brass Band and their bid for the European Brass Band Championship started early one Wednesday morning. Two hours later, the coach arrived looking like some cartoon caricature, with instruments and cases sticking out of every orifice. The timpani never did make it! We proceeded to board the overflowing vehicle and to find our cramped seats, whereupon it was discovered that there were several more passengers to be collected. The coach driver was pleased to see that the equipment was contained in only two small aluminium flight cases - he was less enthusiastic to find that one weighed in



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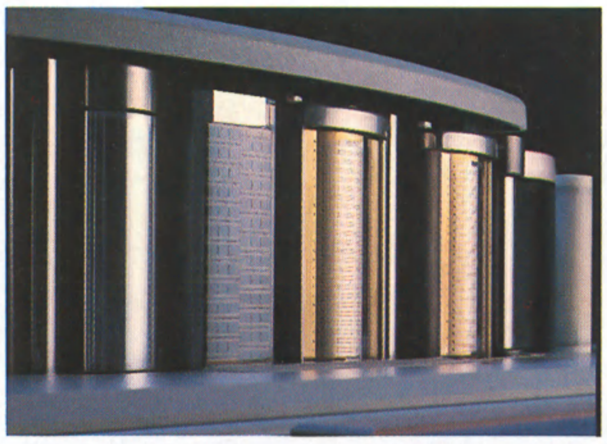

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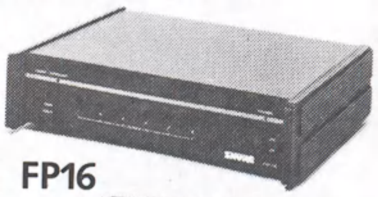
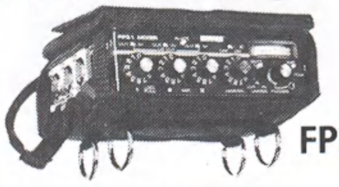

FP16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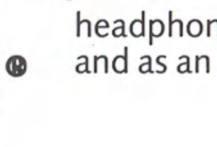
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excess of 30Kg.

Fear and loathing in Dover

Good time was made to Dover, only to discover that had we been on time (the sailing time of our crossing having passed by now), we would still be waiting anyway as the the Seamans' strike had taken effect. Good news then came that we had been allocated a place on the next ferry to sail which was leaving in less than half an hour. I now came up against the British lunch hour. The BBC requires that in circumstances of foreign travel such as this, a customs clearance document called a carnet be used. Customs clearance then consists of showing this document at every border crossing twice, that is on leaving one country and on entering the next. Customs at Dover is usually very efficient due to the sheer volume of people and freight passing through. That is except at lunch time, when there is no alternative but to carry equipment such as ours about half a mile to the customs office. There, a very pleasant young lady with a streaming cold consulted her instruction manual. Eventually we were able to carry all the gear back to the coach. By now, the coach driver who was carrying the heavy case was beginning to think that perhaps he had been on rather more enjoyable trips and we still had three clearances to go - all in foreign languages.

Boarding of the ferry went as planned, and the first real recordings of the project began. Opportunity was also taken to record some excellent sound effects of docking manoeuvres at Calais. Customs clearance at Calais was simplicity itself but I learnt another important rule - always carry BBC pens to give as freebies to French customs officers! Mile after mile of boring

➡

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➡ French countryside ended with an overnight stay outside Paris before continuing across country to Basle. Our education continued as we discovered that brass bandsmen (there are no women in this band) like three things more than anything else - brass band music, beer and loud brass band music. Partial deafness was quite common among the party. Encouraged by our success at French customs, we continued to the Swiss border where we were happily waved through until I produced my carnet whereupon the German equivalent of "you can't bring that through 'ere guv" was uttered, followed by "turn the coach round, turn right, right and right again." Thirty five minutes later, we eventually found a checkpoint officer who said very fluently "Yes that's fine - what sort of lorry do you have?" I said, "We don't have a lorry, we have a coach with a brass band in it." And we were back to square one. An hour and a quarter later, we found a crossing point (with the aid of a very helpful travel agent that we stopped at), at which point the courier mentioned that this was the crossing that they had used in the past. The band were not amused. There followed an exciting half hour when at various times, I was in France, the equipment was in Switzerland and the bus was in 'no mans land', but eventually we all came together and we promised to buy the party a drink as compensation. This was another experience to learn from - a round of drinks for 28 in Switzerland came to £46. Travel continued with constant use of the portable DAT, both inside the bus and at watering holes en route.

DAT learning curve

Bob and I discussed tactics and he decided that whenever a member of the band spoke, the voice should take that position in the binaural image which it occupied in the band formation. For example, the trombone players would be far left. When in the subsequent dubbing, music was added behind (around?) it had the perspective of that player: so the music behind the trombonist had the cornet as the central image. If you find that hard to follow, so did I at first. A further complication was then added; it was possible, due to the impeccable tuning and musicianship of the band, to crossfade between a rehearsal in Treorchy and their peformance in Lucerne, giving a very impressive effect. This type of mixing was made considerably easier by the use of a digital editor. Indeed, with conventional analogue tape, and the multi-generation copying necessary, I doubt that the multiple imaging used would have stayed within a tolerable hiss level for headphone wearers.

The PCM 2000 proved to be a very useful tool for the collection of material on location and offered several useful features, although it was not without operational problems.

After a few minutes familiarisation with the machine, the usual controls associated with a portable recorder of any type become apparent and it is then very easy to collect, store and replay material to the highest technical standard. But this format is not just about recording; careful reading of the 'Japenglish' instruction manual is necessary to understand the remaining facilities. In addition, care must be taken over the selection of settings such as analogue pre-emphasis and digital sampling rate.

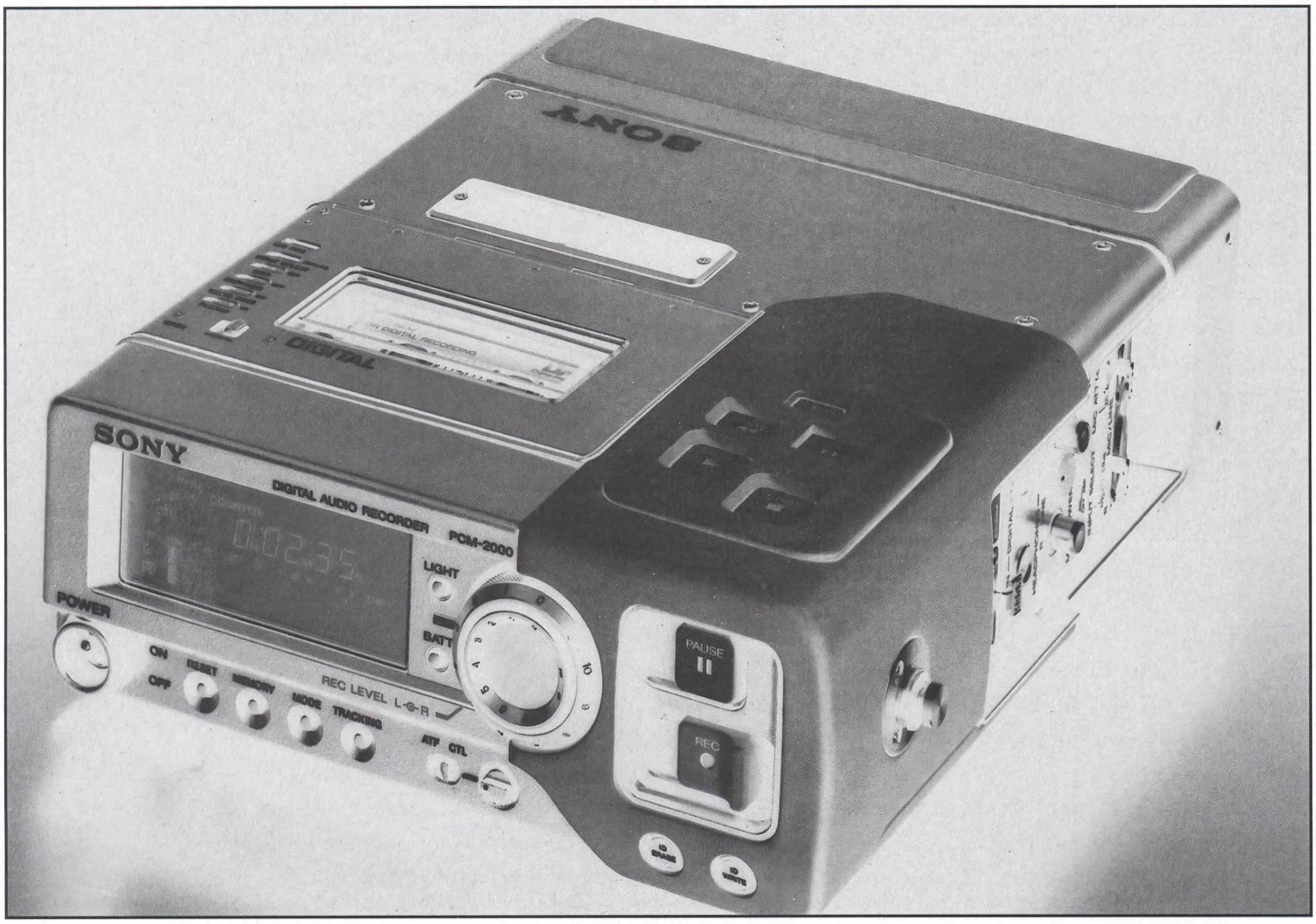
The main operational facility to explore is the invisible ident marking system which allows the operator to put one of two kinds of starting point idents and a skip ident at any point on the tape (except within nine seconds of a similar ident, see later). After much operational experience, it would appear that it should be treated as two separate systems used in different circumstances.

The programme number system is similar to a compact disc track number and is applied during the record process. This, in conjunction with a written log, allows accurate and speedy retrieval of selected items.

Any marked point on a two hour tape can thus be accessed within 50 seconds at the quoted 200 times play speed. Programme numbers increment automatically and are displayed in the LC display both on record and playback. Unfortunately, if the battery fails or the machine is switched off, it defaults to zero. It is a pity that some sort of backup battery could not be incorporated to save the inconvenience of incrementing the number manually, a facility which can be used at any time to select the next programme number to be written.

However, if replay is selected to review the last item for example, and then allowed to run on into previously recorded, idented material, the present programme number will take that identity and increment from that number for future idents.

A search function is incorporated, which will find the next programme number in any direction and play the first nine seconds of that item, ➡



➡ before going into fast spool to locate the next and so on until stopped. During playback, further ident marks can be applied, in the form of 'start' or 'skip' marks. These allow the user to select wanted portions of prerecorded material and mark the beginning with a start ID and the end with a skip ID. During subsequent playback, the machine will play until it comes to the next start ID or programme ID. This was the facility used in the documentary where seven hours of material had to be condensed to 45 minutes of programme time. Bob was able to select and review his inserts away from the studio and theoretically just allow the DAT to automatically transfer the inserts to the AudioFile.

However, the accuracy of the markers was quite poor - it was difficult to find, for example, the start of a word within a sentence, but worse still, having marked it accurately, its subsequent replay was very inaccurate, often missing words entirely. The practical trick here is to mark coarsely and to take care of fine editing later. Used in this way it is a very powerful aid to programme compilation, with, of course, no destruction of the original inserts and greatly eased but unproven, storage problems for raw material. All idents are erasable.

Stop at zero

The accuracy of the clock timer was also much worse than we have come to expect of things digital, with wildly varying and inaccurate times displayed, due, I think, to tape slippage. It would be useful if the stop at zero memory function worked in fast forward as well as rewind. Indication is given of both elapsed time and time remaining on cassette, which is useful when making maximum use of the two hours recording time. Audio monitoring is by domestic headphone jack and excellent level indication from the LC display, which has an automatic shut-off backlight, to conserve batteries. The line output connections, which carry input source at appropriate times, are available via two gold plated domestic phono sockets and are unbalanced.

Unfortunately, to monitor incoming signals, it is necessary to enter either record or pause record. This is unsatisfactory on two accounts. The manual specifically warns against prolonged use of pause because of possible tape and/or ➡

WHICH Console SOLD 16 UNITS BEFORE ITS Launch

➡ head wear and it increases the battery drain considerably. (Battery consumption averaged sixty to seventy minutes overall with best performance of 107 minutes when recording from line without pausing or stopping.)

Indication of a failing battery is by a two stage warning, first a flashing 'BATT' on the LC display, then a 'CAUT'(tion) at which time no new function can be selected. Failure after that is pretty dramatic, as the tape (which is the most sensitive and least robust part of the R-DAT medium) cannot be removed and on two ocassions, the tape was left only partially unlaced from the heads. Recording level control is by an ingeniously contrived pair of locking concentric knobs for the inputs of line, microphones or digital via the AES/EBU compatible port. Gain was satisfactory from the microphone XLRs which are equipped with pads of 20dBs and 40dBs.

Comprehensive phantom powering is also available. It is very easy to capture dynamic ranges approaching reality when used with good quality microphones, which can lead to problems when trying to broadcast the finished product. Gain on the analogue line input seemed insufficient to me, it being necessary to turn the controls to maximum to achieve an indicated level of 24dBs below maximum with a BBC PPM 4 level source. This gave a practical headroom of 16dBs which is not needed in many circumstances and resulted in quantising noise being heard during quiet passages of normal programme material.

The general feel of the machine is very professional, and physically well balanced when clipped to the included carrying strap. After periods of four hours or more, no real discomfort was experienced. The freedom this allowed made it possible to attempt what might have been impossible if encumbered with spools of tape and so on.

For situations demanding less portability, the recorder will accommodate an external 12V d.c. supply, either mains or battery, connected by means of a four pin XLR socket. Overall this is a recorder which could radically change the method of operation of much sound recording work and makes an ideal medium for location recording and collection of sound effects. Provision has been made for the simultaneous recording of linear time code from an external source onto a spare analogue track.

Two problems are apparent with this system. One concerns the accuracy of code written on a tape travelling at only 0.3 inches per second and its subsequent reading without corruption. A time code regenerator could be helpful here. The second is due to the delay imposed on the audio signal as it is recorded and replayed. This leads to an apparently constant and therefore correctable offset between signal and code. Unfortunately no real use was made of this facility while in my possession, due to lack of time, but obvious possibilities for high quality sound collection in conjunction with video or film are apparent. It should be borne in mind, however, that first generation editing would only be possible with a digital editor of course. A second possibility that I was unable to explore was that of compilation from one machine to another using the pause control on the recording machine. I understand from other sources that this should be very successful and makes small scale compilation feasible at minimum cost.

Editing on AudioFile proved a long process, with much time taken over loading and saving. Fine editing also proved labourious, although the flexibility always seemed to justify the extra time spent. Certainly the documentary was well received locally and has given us much to think about. As Des Bennet put it - we were on a very steep learning curve, actually discovering bugs in the software which AMS were unsure about.

The pressures during this time were enormous, especially for Bob with the first transmission taking place only a week after returning to this country. The second transmission took place four days later when an old problem appeared in a new form.

Nightmare in Continuity

I was, by this time, using DAT for another project, and arrived in Continuity only twenty minutes before transmission. I proceeded to set up the machine only to find the d.c. power lead missing. I quickly ran down two floors and some distance to O.B. stores to get another and arrived back out of breath. The con-op and announcer were now looking doubtfully at me, but were not too disturbed because the analogue back up was on a tape machine.

I continued to line up with only fifteen minutes to go and realised, with horror and the most awful sinking feeling in my stomach, that I had the correct cassette box, but the wrong cassette ➡

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➡ in it. Somehow, after the first transmission, which had been on MW only, one of the insert tapes had become mixed up during a copying session. The tape which Bob had so carefully given to me that afternoon was the wrong one. It was now ten minutes to transmission, and it was Bob's birthday and he was out for the evening. I had one clone of the tape but it was in my filing cabinet four floors and two blocks away. Already out of breath, I started running and decided not to risk the lift but made for the stairs. By the time I reached Continuity again I was unable to speak more than "there's ten seconds of silence after the tone" and thrust it into the hand of the con-op. Three minutes later, the first binaural totally digitally recorded, edited and transmitted from DAT, programme hit the air.

The programme which had caused my late arrival in Continuity was our second project with the PCM 2000, a binaural drama for Radio Four. This made extensive use of the programme numbering facility and introduced a new flexibility into our location recording process with total portability and the minimum of interruption to the flow of the production. Usually with a portable Nagra at 15 i.p.s., one take of a scene fills the usable space on a five inch spool. We stopped once in two days for tape changing!

The source DATs were subsequently uploaded to AudioFile for editing where again the slowness of editing that would be very straightforward on tape was only justified by the superb quality and flexibility which that device offers.

Where next? I feel that Dolby SR may have a part to play, and to this end, Graham Carter of Dolby Labs has loaned us eight tracks. My proposition is that collection and long term storage of drama material will be made on DAT. Material for editing will be transferred to AudioFile for compilation and mixing and downloaded to the final transmission medium. This would make maximum use of all available facilities and traditional skills.

Our next project using Dolby SR as source material for AudioFile editing is the play destined for transmission on Radio Three during Christmas week and involves, apart from the cast, Llandaff Cathedral choir, the BBC Welsh Chorus and the BBC Welsh Symphony Orchestra, all performing specially composed music conducted by the composer while listening on headphones. Now what days did Des Bennet say he had free in October? ❒

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Bowen A'i Bartner

In the latest of Line Up's case histories of stereo TV productions we look at an episode from a series entitled 'Bowen A'i Bartner' recorded by BBC Wales for the Welsh fourth channel - Sianel Pedurar Cymru (S4C). Shot entirely on location, it was the third series of this fast moving thriller and "with a rush of over confidence" Peter Hunt decided to record it in stereo.

Cover story by Peter Hunt, Senior Audio Supervisor, and Jonah Jones, Audio Supervisor.

The producer, Peter Edwards, was keen to try the experiment on the understanding that it wouldn't take up any more production time than the mono equivalent either on location, or in post production. At the time of recording, we intended to broadcast the stereo using Radio Cymru's FM network but contractual problems with the artists' payment prevented this.

This, the third and last series of 'Bowen' to be produced, is a detective series about an ex-cop Jim Bowen, his partner Gethin and secretary - Girl Friday Jane. The stories are normally based in and around the Cardiff area. The producer very much likes the stories to have a 'streetwise' feel about them. To this end, every scene is shot on location, and, if possible, in the environment that the scene might have occured. That is to say that if a scene is set in a busy pub on a Saturday night in the centre of Cardiff, then it is shot in a busy pub, and not with extras, but with the normal clientele of that pub. Not exactly the easiest way to shoot drama with mono sound, let alone stereo.

We had about ten weeks in which to shoot six fifty-minute episodes using BBC Wales' two camera drama unit. At the first planning meeting, Peter Edwards revealed that he wanted to use the unit with two cameras on one day each week, then on the other four, the unit would be split in half, and operate as two single camera units.

We decided that in order to protect the mono sound, we would use M&S throughout until the dub, when the components would be decoded to A&B. We opted to use the Sennheiser MK416 as the 'M' mic, and an AKG C451 with a CK4 capsule as the 'S' mic. Whilst the configuration of a short gun mic and a figure of eight hardly gives stereo, the viewer gets dialogue in the centre and ambience across the stereo stage. This was to prove the correct approach in this situation. Rycote provided us with twin 'over and under' microphone mounts, pistol grips, enlarged plastic wind muffs and wind jammers. This was to be the only actual expense of the whole operation. When radio microphones or 'spot' mics were required, these were simply routed to the 'M' output of the desk. The Studer B62 tape machine in the two camera unit was temporarily replaced with a Studer A810 with centre track time code capability, which was to be fed directly by the time code generated on the one inch vtr. The stereo output on the sound desk, which was still M&S, was fed to tracks one and two of both the vtr and the tape machine, feeding it through an 'M&S' to 'A&D' convertor and listening on stereo headphones.

The second single camera unit was a

➡

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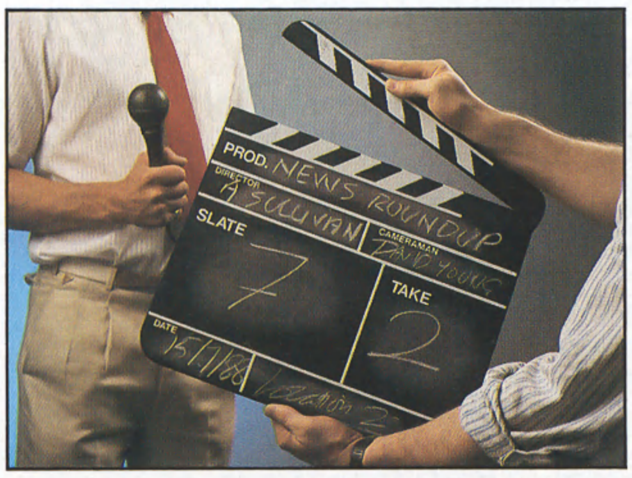

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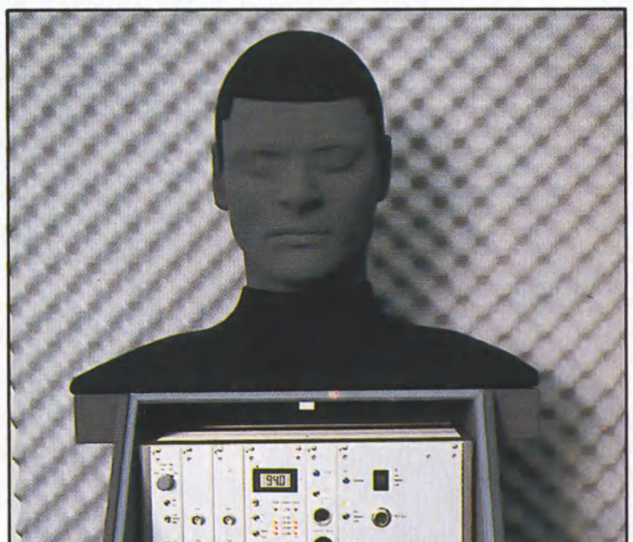

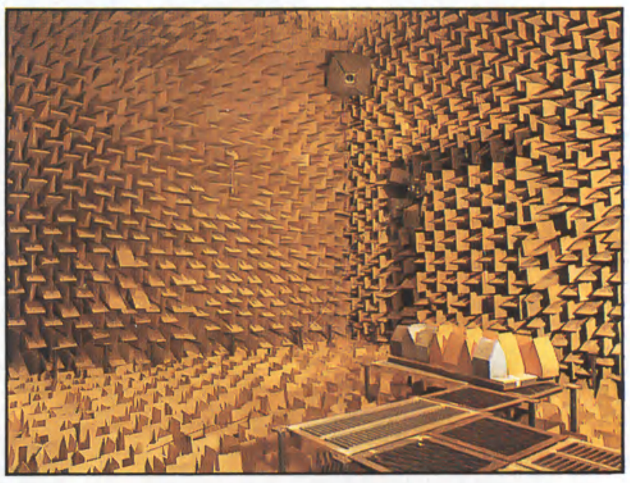

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'Streetwise' action from 'Bowen A'i Bartner'

➡

Renault van, custom built locally by BBC Wales, and designed to use one of the Ikegami cameras from the drama unit. The sound facility on board consisted of a six channel stereo Glensound mixer, a stereo Nagra and a portable one inch vtr. For the duration of the shoot, we replaced the stereo Nagra with a pilot tone model. This meant that we relayed sound recorded on either vehicle (if necessary) in the dub in sync. There were a few ocassions when the gear in this vehicle went totally portable, and then the Nagra provided phantom power to the M&S mics, and its direct output supplied vtr.

Mono compatibility

Monitoring A&B caused some difficulties in judging mono compatibility, and since the mono signal was the most significant, often the 'S' leg was either left unmonitored during the actual take or M&S monitored on stereo headphones - initially a very strange effect but you'd be surprised how quickly you can adapt to hear any problems. (If a car drove passed it approached in our right ear, as it passed, it was in our left ear, and then it went away via our right ear again.)

On the few days that we worked as a two camera unit, and shot scenes in their entirety, we often had to use two fish poles. We found that mixing both mics on each pole created the most undesirable effects for the listener. On some occasions, we rigged a fixed 'S' mic into a set, and used that instead of the mic on the pole. It was found that a better result was often achieved by using the most centrally placed 'S' mic and crossfading the two 'M' mics as against crossfading all four mics which produced very strange phase effects. The fact that the 'S' mic position was constant affected the imaging and positioning far less than might be assumed. The occasional use of personal mics was still covered by the stereo pair with the personal mics panned centrally at all times.

Generally we tried to keep all dialogue in

➡

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"OK OK, I'll fax the article through on Friday, I promise!"

➡

the centre so as to keep the positioning the same in cross shots as shifts in the character's aural position can be very distracting even though the visual image may be changing at the time. For the same reasons, we tried to keep the angles of the microphone relative to the action, as constant as pictures would allow.

Provided that the position of the CK4 mic was borne in mind, using the mic under or over the subjects (causing the equivalent of an A/B reversal) was easily dealt with in dubbing.

Occasionally, the CK4 was twisted around relative to the 416 in order to accommodate certain shots which once again gave no trouble at the dubbing stage.

Handling noise on the 'S' mic was very prone, as one would expect it to be, but we did find that we could roll off bass quite steeply from about 250Hz without affecting the stereo after decoding.

Thinking ahead to the editing problems, and the possibility of the ambience changing on the cuts, our fish pole operators endeavoured to operate the poles in the same plane throughout a scene. So having established a plane for the shoot of the scene in wide angle, that plane was maintained for the mid-shots and close-ups. There were occasions, due to lighting or purely the physical size of the room, when this was not possible. But on reviewing the programme after editing, 99 times out of 100, we were unable to hear the join.

One problem that did arise, and which did cause hassle was the lighting chokes. Although situated well out of the way, their buzz could be heard on the 'S' track whilst clean on the 'M' track. The Sparks helped by making sure that they were rigged as far away as possible. One of our lighting directors, Joe Hakeney, discovered that if the choke was placed on its end, it stopped buzzing.

When it came to editing, the vt editor, Simon Meek, after cursing us for taking away one of his editing tracks, re-adopted the techniques used in the days of single track quad machines, that was to lift off sounds required onto a synchronised twin track quarter inch machine. In order to monitor the stereo in the editing suite, Simon used an M&S to A&B convertor across his loudspeaker feeds.

The material arrived from the two units with no noise reduction, but it was decided to introduce noise reduction at the commencement of editing, and using Dolby A on both tracks, they both remained in that state until the lay back of the final mix after the dub.

Where it was feasible, Simon would just edit the M&S tracks along with the picture. It was here that the technique of keeping the microphones in the same plane throughout the scene's shoot helped enourmously with the editing. If a change could be heard on a cut, then we would have to cover the join with extra FX on the dub.

There were times when the Director required dialogue to run on into the next scene. Here Simon either mixed or cut the 'S' track along with the picture, but allowed the 'M' track to continue to its natural conclusion.

The dubbing theatre was equipped with an Otari 8 track with Maglink synchronisation. Fortunately, we had seen the very recent

➡

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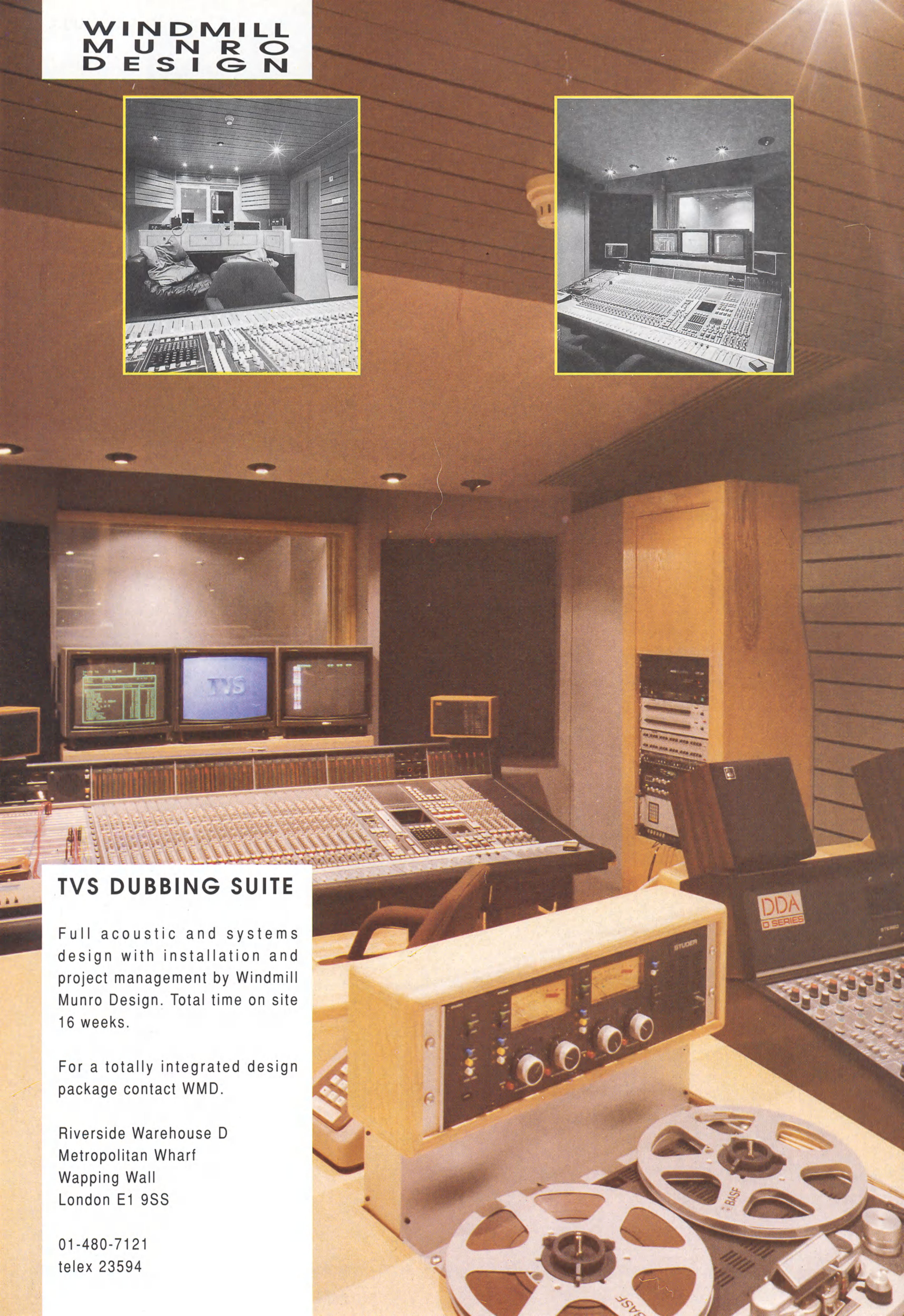

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➠ arrival of two Nagra-T recorders destined for the U-Matic editing suites. The Nagras required EBU time code, so our engineer kindly provided a U-Matic tape with EBU code on one track and Maglink on the other, so that the two synchronising systems could talk to each other.

Music was recorded onto one of the Nagras and effect added to the eight track until all the tracks were used up and then bounced onto the other Nagra in order to make more tracks available. Given a twenty-four track machine in the first place, obviously all this complexity would have been redundant, but availability at the time required was a problem.

Mono time

A final mix was then laid, and Dolby encoded onto the Otari being decoded only for the layback. The whole operation, with the exception of the dub, was completed in the time that had been allocated as a mono production. On no occasion was production held up for the stereo - vt editing had been allowed three days and Simon completed that in the allocated time. Dubbing also normally has three eight hour days, and although we took four, it has to be remembered that we produced two pre-mixes which took most of that extra day.

As well as the normal benefits that stereo width gives to ambience and FX such as in the pub scenes, we were also able to exploit the medium more obviously in some sequences, not only in such things as the dramatic car chase up narrow lanes that began this episode, but also in one of the closing sequences where police are closing in on one of the villains who is waiting in a hut in a park. Here we were able to use police walkie-talkie messages in a stylised way coming hard-left and right as the viewer watches the trap being sprung.

When all the shooting, car crashes and zig-zagging around the environs of Cardiff were over, one of the episodes was shown in stereo to all interested parties in a BBC boardroom. All of us who worked on it were pleasantly surprised at how good the stereo effect was with so little extra time spent on it (half a day editing and half a day dubbing over the usual time allotted). Given the occasional rough edges due to this fast turn-round, most of the audience felt that there was a greater sense of 'being there', which in the end is what the whole business is about. ❐

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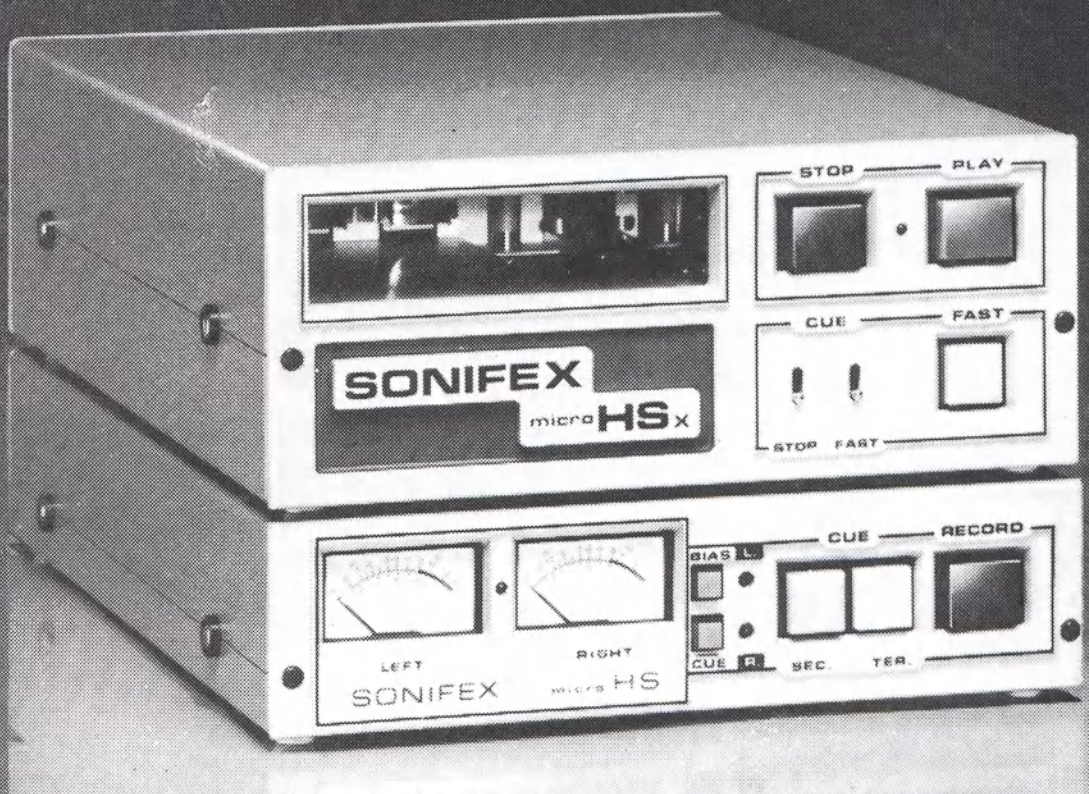

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MADI

the multichannel interface

The problem: serial transfer of digital audio data between different multichannel machines. The proposal: a standard produced by an influential group which would be cheap to implement, easy to understand and acceptable to the pro-audio industry as a whole, so that it could be widely adopted as soon as possible. Steve Terepin reports on the MADI initiative

One of the most talked-about events at the March Audio Engineering Society convention in Paris was the joint launch of a new initiative on the interconnection of multichannel digital audio equipment. Not only does it directly answer many of the questions and objections to the more widespread adoption of digital techniques, but it was proposed by a group of UK-based companies better known for their commercial rivalry than their ability to cooperate.

Until comparatively recently, the only widely used digital recording equipment comprised multitrack tape machines and outboard effects boxes. Since these were usually used in conjunction with an analogue-based recording console, the production of finished recorded material would inevitably involve many conversions of the signal from analogue to digital form and back again with consequent degradation of the quality of the finished material.

With the arrival of the new generation of mixing and editing equipment such as the SSL 01, Neve DTC, AMS AudioFile, NED Synclavier and others, the possibility of performing all stages of the production of a recording in the digital domain became apparent. In a suitably equipped studio of the near future, it will be possible to perform a single analogue-to-digital conversion on the original signal source, feed it to a digital mixing console for treatment, store it on a digital multitrack, do the final mix on a mixer/editor and dump to an accepted digital format for CD mastering. All of the interconnections in such a system must be in the digital domain to prevent the degradation brought on by multiple analogue-to-digital and digital-to-analogue conversions.

The major obstacle to be overcome in achieving this, with all of its possibilities for the creative and qualitative advancement of the recording business, is the problem of interconnecting digital equipment from different manufacturers. To date there have been several attempts to define a standard for the serial transfer of digital audio data between different machines. Most of these have been introduced by individual manufacturers as part of their own marketing strategies and have not yet received widespread acceptance. The only exception to this is the AES/EBU twin channel format, which has begun to appear on an increasing range of equipment.

However this, like all the standards that have appeared to date, can carry at most a pair of signals on a single cable. The problem with such a twin channel system can be seen by considering the interconnection of a multitrack tape machine to a digital console. For each pair of tracks on the tape machine, two cables will be necessary between it and the console, one for send

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AES
Sustaining

➡ from the console and one for return to the console. At both the transmitting and receiving end of these cables, there will be extensive circuitry to encode and decode the data. All of this adds up to more expensive products which are more difficult to use and maintain.

Single cable solution

What was required was obvious to anyone who cared to think about it - a method of sending multiple channels of data between equipment along a single cable. Any standard proposed must be cheap to implement, easy to understand and acceptable to the pro-audio industry as a whole so that it will be widely adopted as soon as possible.

How to define such a standard and get it universally accepted was a more difficult task. The Audio Engineering Society is the obvious forum for such work and has performed a sterling service to the audio industry by defining and standardising the AES/EBU twin channel format. This allows the transmission of two mono signals or one stereo signal down a single length of shielded twisted pair cable. In this multiplex, one frame of data is transmitted during each sample period, comprising two subframes each of 32 bits in length.

Diagram A shows the format of data within a subframe. The first 4 bits indicate whether the sample contained in the subframe is from Channel A or Channel B, corresponding to left or right respectively, where the two signals are a stereo pair. The following 24 bits contain the audio sample, with the most significant bit of the sample always aligned at bit position 27 within the subframe. Where the sample being transmitted is less than 24 bits long, unused bits are set to zero. The trailing 4 bits all have special meanings. The 'V' bit is a flag to indicate that the subframe contains valid audio data. The meaning of the 'U' bit may be defined by the user. The 'C' bit when correctly assembled into a block of data over a number of sample periods indicates sample rate, professional or consumer use, pre-emphasis and so on. The 'P' bit sets the parity of the subframe to even, allowing the receiver to check for errors that might have occurred during transmission.

MADI collaboration

The Digital I/O Working Group of the AES had been considering multichannel interfacing for some time, but progress was limited by ➡

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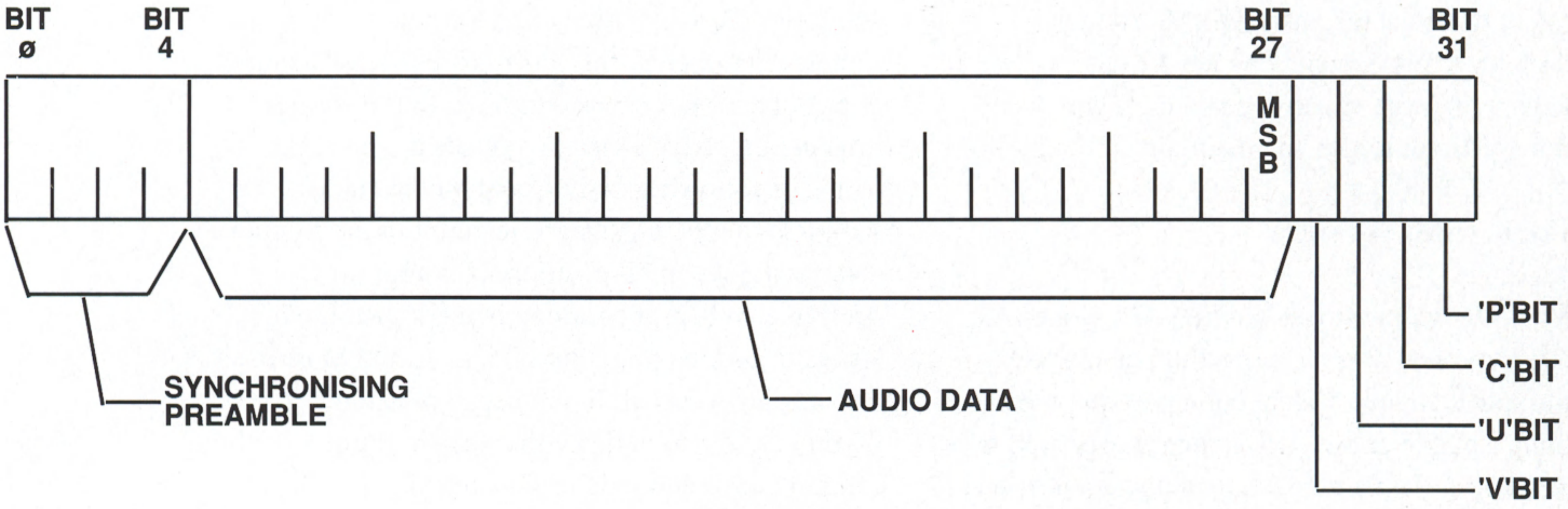
DIAGRAM A



Format of an AES/EBU channel data subframe

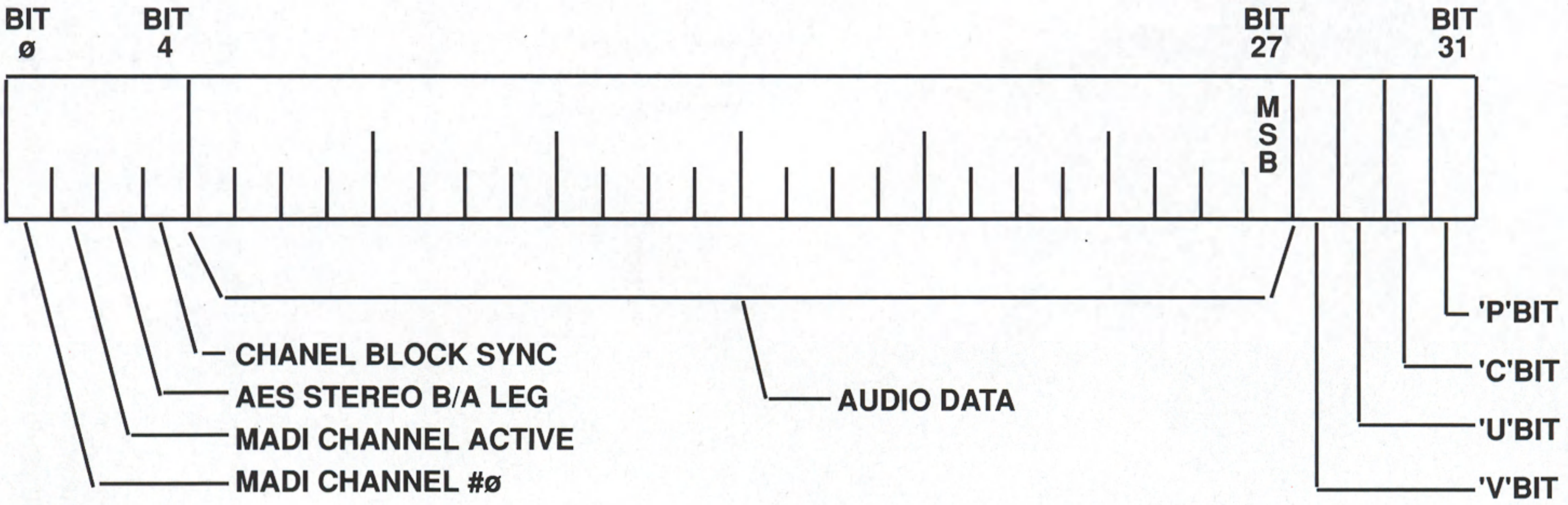
➡ the small number of meetings that could take place at conventions and conferences.

The manufacturers who had become involved in the MADI collaboration had all individually begun to feel customer pressure to produce equipment that could be interconnected more easily and cheaply. Contacts were established between the engineering departments of Solid State Logic, Neve Electronics, Sony Broadcast and Mitsubishi Pro-Audio Group in the UK and a meeting was convened to discuss possible answers to this problem. The reason for these particular companies being involved and not others was not a sinister attempt to form a new axis within the pro-audio industry, more an accident of history. Contacts were made between people who knew each other and it was decided to limit the size of the group to two tape manufacturers and two console manufacturers in the interests of achieving results within the shortest possible time.

It was decided that the members of the group would attempt to fully specify a multichannel interface that could be easily and cheaply constructed, and would attack as many of the signal interconnection problems between equipment as possible. The results of this exercise were to be a document which would be handed to the AES for consideration as a recognised standard, together with a hardware prototyping exercise which would produce prototype units to be displayed at the Paris AES Convention at the beginning of March, 1988. A demonstration of the equipment of the participating companies, interconnected by means of the new interface, was to take place on a stand at this convention. It was also decided that information on how to

Format of a single MADI channel

DIAGRAM B



implement the interface would be freely available to other manufacturers and users in order to promote widespread adoption of the interface. No proprietary hardware or software rights belonging to any of the MADI Group would exist in connection with the design of the interface.

Further meetings between the participating companies were held in the Autumn of 1987 to determine the exact form of the interface. It was decided to base the format of the data transmitted on that of the successful AES/EBU twin channel format in the interests of building on previous work rather than reinventing the wheel. The form of the document to be presented to the AES was determined in parallel with the design work going on in each of the companies to implement the interface in one of their own products. A presentation of the completed document was made to members of the AES working group on Digital I/O towards the end of 1987 at which it was agreed that the MADI Proposal would be discussed as a full meeting of the committee at the forthcoming Paris AES Convention.

The MADI Proposal

What emerged from the discussions between the members of the MADI Group was a proposal for a serial multichannel digital interface capable of carrying 56 channels of audio data of up to 24 bits resolution per audio sample.

Comparison with the previous diagram of the AES/EBU data subframe shows that the MADI channel data format is almost identical; the only exception being the first 4 bits. Bit 0 in the MADI format becomes a flag to indicate Channel 0 - the first to be transmitted in a new sample period. This allows the receiver to correctly decode the following channels. Bit 1 indicates whether the transmitter of the data regarded it as valid. Bits 2 and 3 are used to encode the three possible four bit preambles transmitted at the start of an AES/EBU subframe. The remainder of the MADI format is identical to that of the AES/EBU subframe. This means that a MADI link can be arranged to be transparent to AES/EBU information - data can be converted from one format to the other and back again with no loss of information. However, the electrical characteristics of the two interfaces are completely different: AES/EBU is a 3 Mbit/s serial signal carried on shielded twisted pair, whilst MADI is a 125Mbit/s serial signal carried on coaxial cable.

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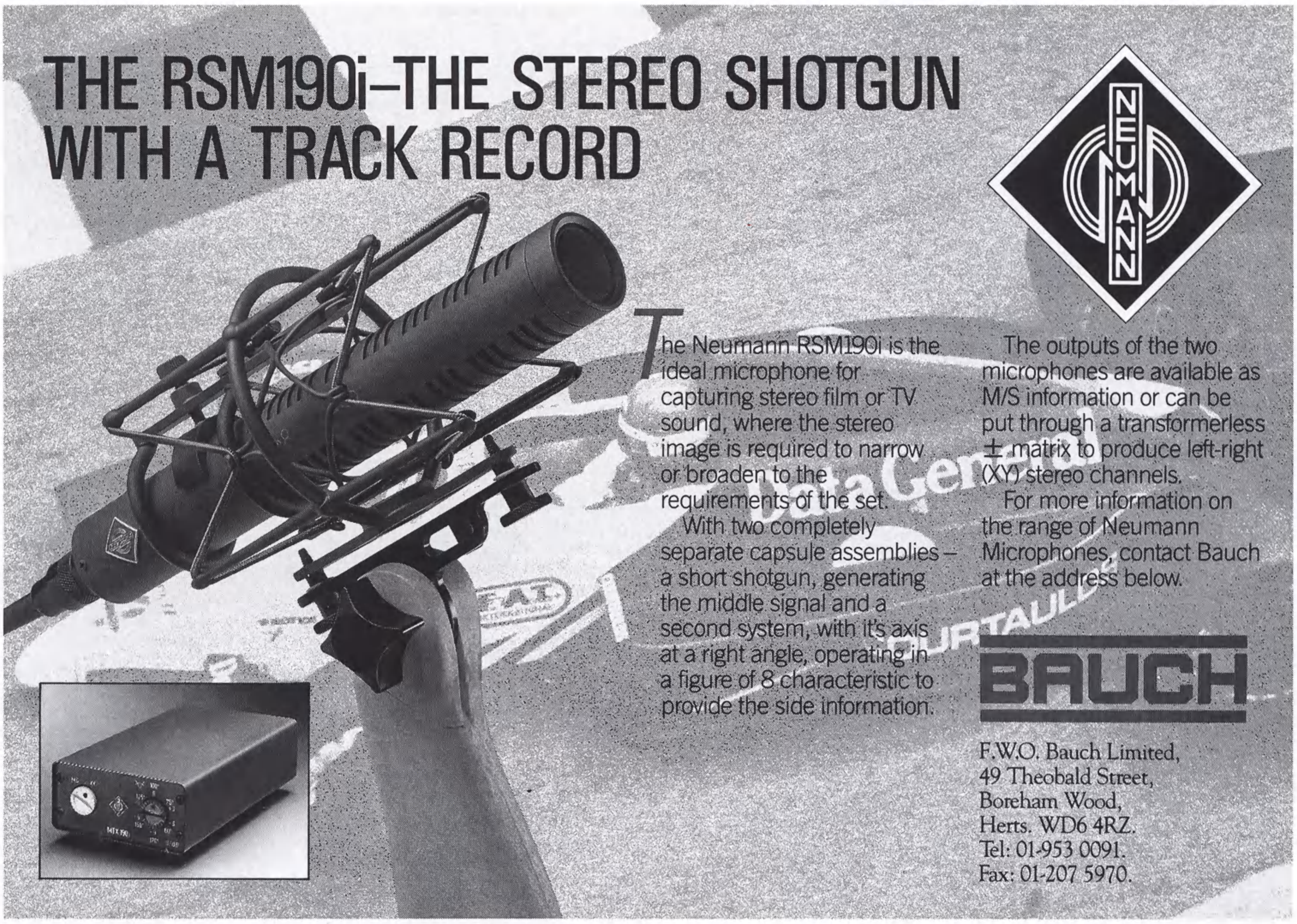

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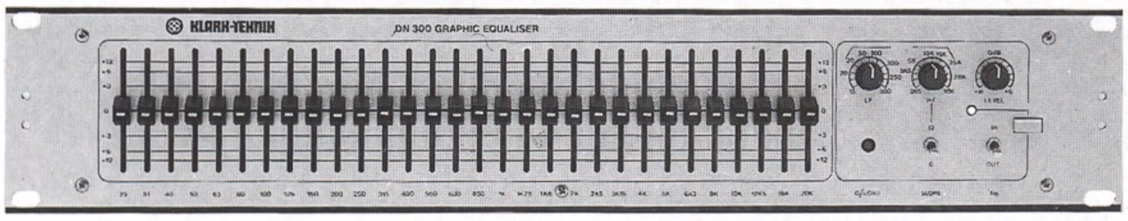

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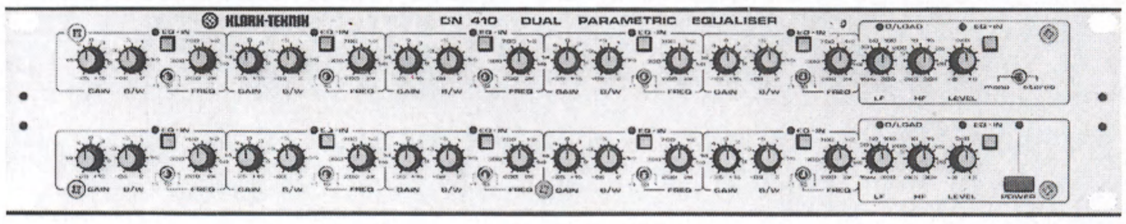

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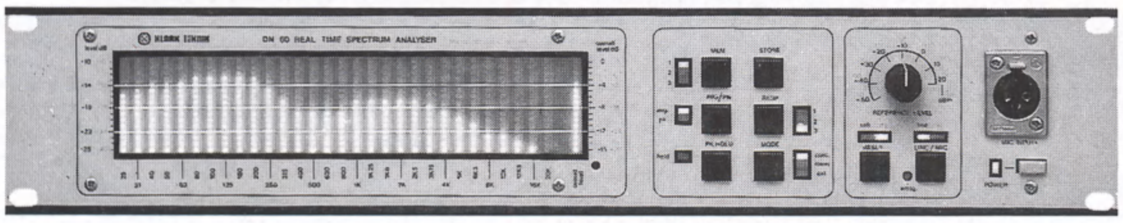

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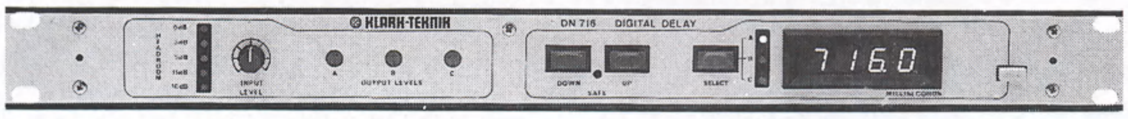

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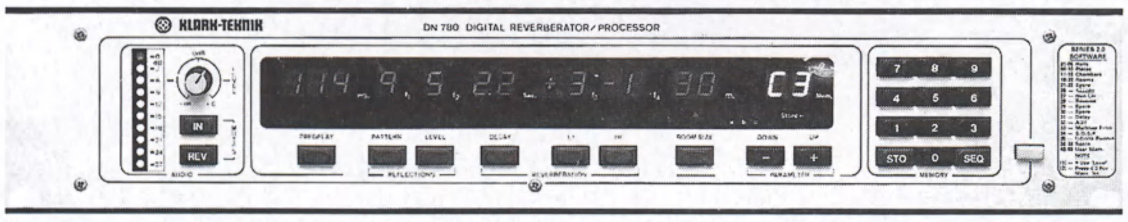

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➡ The interface is implemented as a point to point link from transmitter to receiver. Hence, for a connection between a console and tape machine, two cables carrying data are necessary, one for the sends from the console and one for the returns.

All MADI installations will support cable runs of up to 50 metres without any requirement to match cable lengths. With special care, the interface could be made to work over distances considerably longer than this.

The hardware required to implement the interface is based on standard silicon chips produced for high speed computer networking and is thus cheap and readily available. This will lead to a massive reduction in costs for both manufacturers and customers. This cost will both be in the form of cabling savings and also hardware savings within the equipment itself.

The cable required to implement a MADI link is standard 75 ohm BNC-terminated video coaxial cable of the type already to be found in many recording studios. For longer cable runs, a fibre optic option is envisaged for data transmission, but this is not yet defined.

The MADI Proposal can support a common sample rate for all the channels on the link varying from 32kHz to 48kHz. A facility to operate at +/- 12% of these nominal rates is provided. Higher sample rates can be accommodated by running the MADI link at a sub-multiple of the desired sampling frequency and using two consecutive MADI channels on the link for sample data. A few channels of digital audio could be transferred from one unit to another at greater than real time rate using a similar method.

Digital equipment operates with reference to an internal clock running at the sample rate of the system. In order for a large number of digital systems to work together, all of the individual clocks of each piece of equipment must be synchronised together. In many applications to date, only a few pieces of digital equipment have been used together and it has been possible to arrange the synchronisation of these experimentally. With an increasing amount of digital equipment being found in studios, a more rigorous approach to the synchronisation of sample clocks is necessary. The MADI Proposal takes account of work done within the AES on synchronisation of digital audio systems and employs a distributed master synchronising signal which is fed separately to all interconnected ➡

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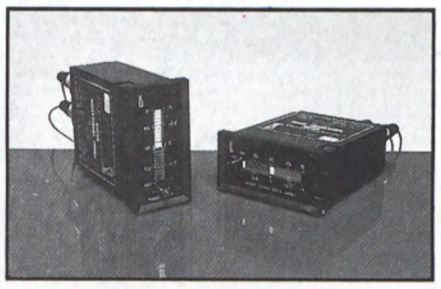

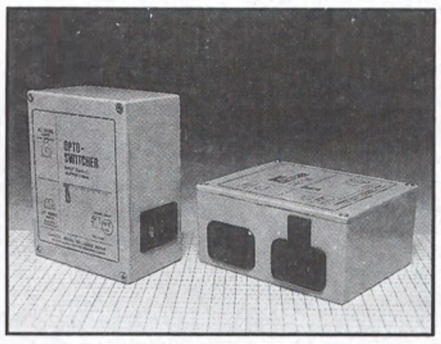

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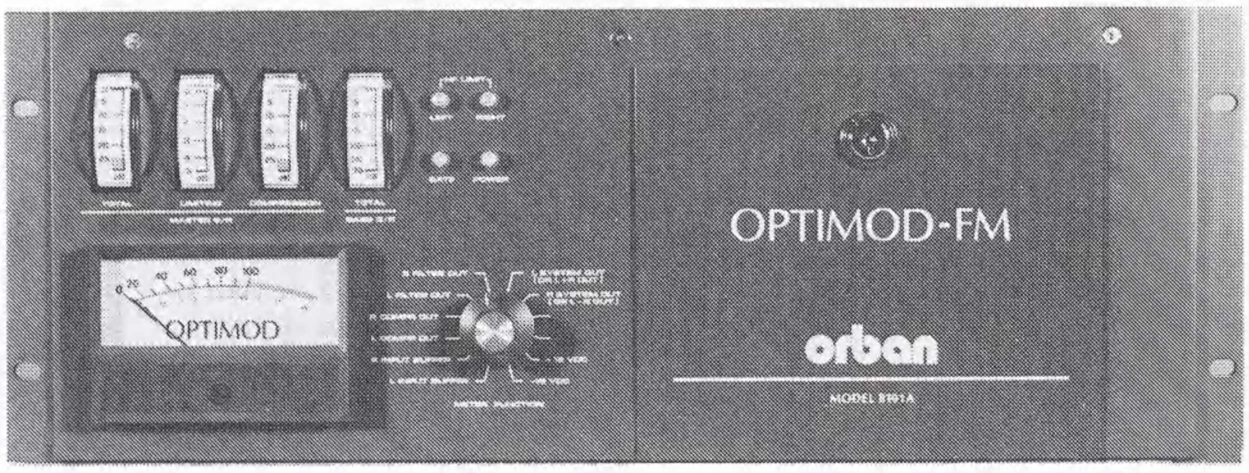

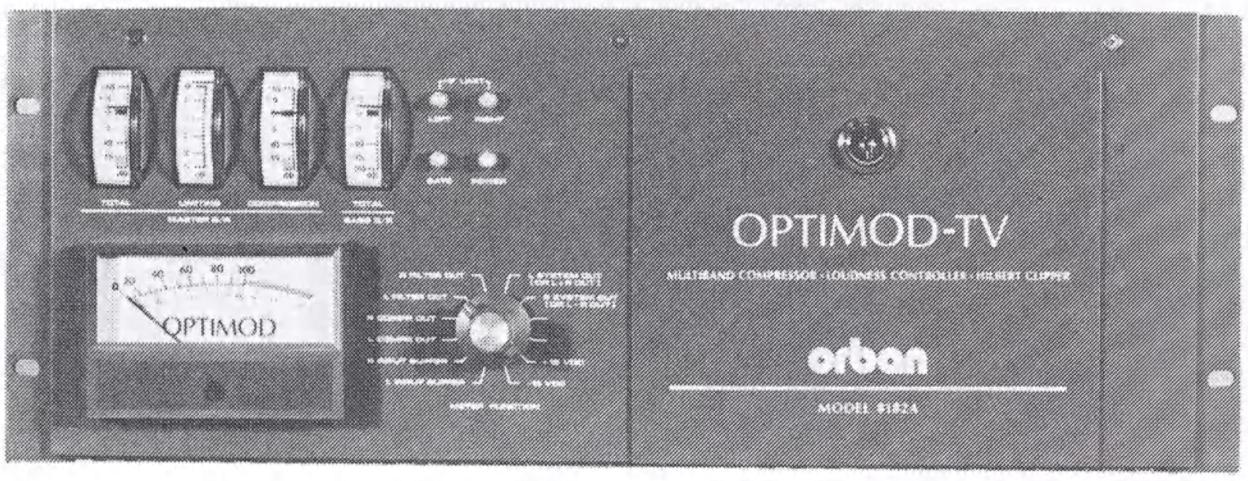
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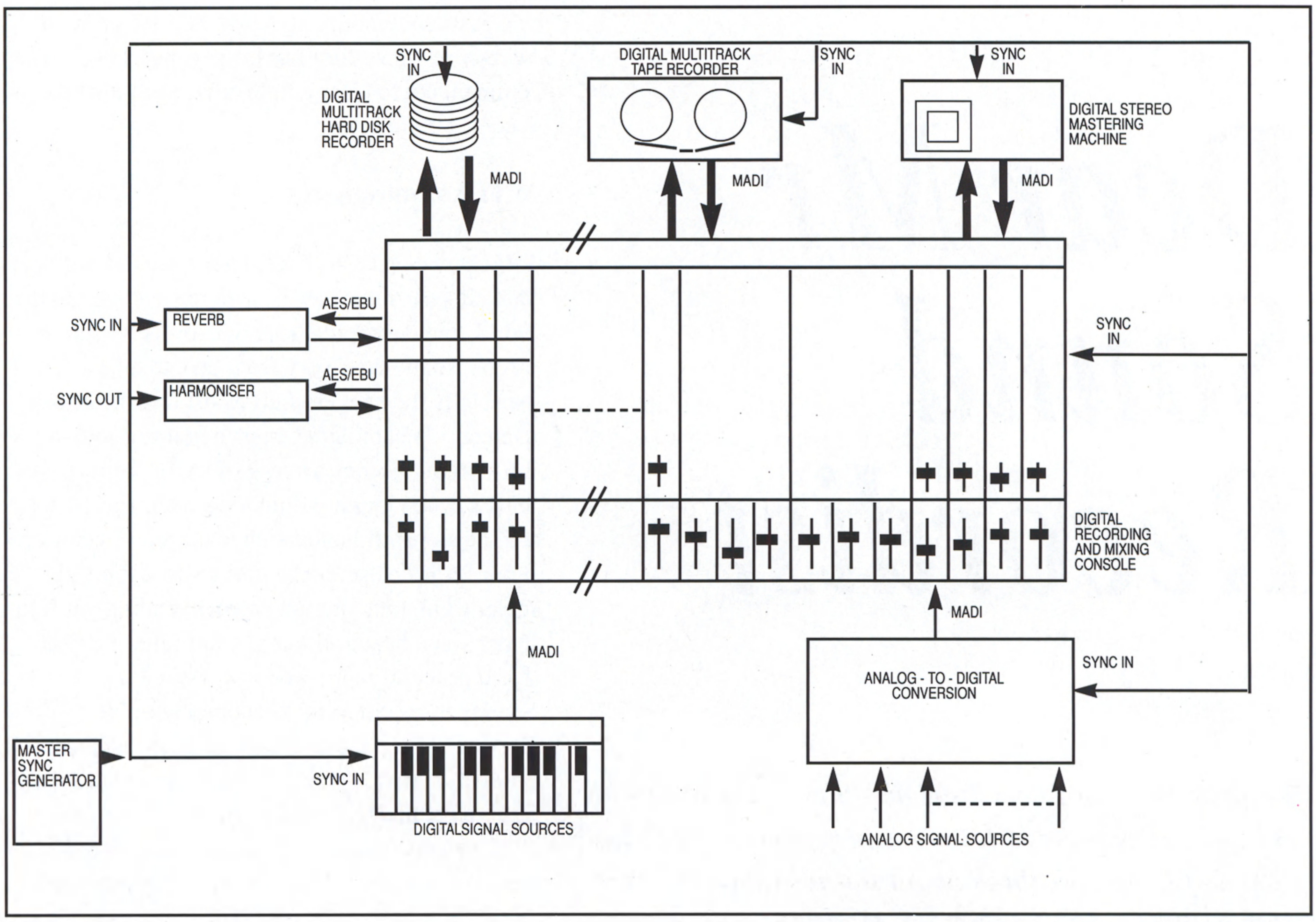

The 'digital studio'

➡ equipment. This is similar in concept to a video house sync, but does not have such stringent requirements for plant timing.

The diagram shows what might be a typical installation of MADI equipment, comprising a digital mixing console, analogue-to-digital conversion system and a variety of signal storage and processing devices. Each link shown between equipment comprises a single length of coaxial cable carrying up to 56 channels of audio. In addition, each separate piece of equipment has the house master synchronising signal distributed to it. It is quite conceivable that MADI could prove cost effective even in links carrying substantially less than 56 channels of data.

Reactions to the MADI Initiative

At the AES Paris Convention, the AES Working Group on Digital I/O received a demonstration of two pieces of equipment communicating over working prototypes of the interface. At a full meeting of the Working Group, it was decided that the AES would put the MADI Proposal forward for standardisation by the appropriate international organisation. It was warned that this process would take a number of years, but the members of the MADI Group made their intention known to implement the proposed standard in their products at the earliest opportunity without waiting for the standardisation procedure to be complete.

On the floor of the convention, the reaction of both users and manufacturers to the MADI initiative was almost universally favourable, with almost all the world's manufacturers of digital pro-audio gear collecting copies of the MADI document and promising to evaluate it for use in their own products as appropriate. The working demonstration of the interface proved a major factor in achieving this level of interest. The convention also saw the launch of the first product to incorporate MADI as a standard feature; the Solid State Logic 01 Digital Production Centre.

The future of MADI now rests in the hands of the buyers of digital pro-audio equipment. If you believe that it is an important step towards a mature industry, then ask your suppliers when they will be producing equipment supporting this new initiative. Any manufacturers wanting more information on this standard and its implementation should contact any of the four participating companies in the MADI Group. ❐

Dear Mr Sound Recordist

We all know what film editors do - they're the ones who sit in nice cosy rooms working nice regular hours! But what do film editors think about sound recordists - and what do they want? To find out, Magazine Committee member Richard Cobourne asked BBC Wales editor Alan Avery to pen some thoughts on his view from the cutting room. Alan duly obliges here, and even names his all-time favourite sound recordist! Now read on...

I've worked in film production now for 26 years, firstly in an internal unit at Laing the builders and civil engineers, where I learnt my trade through 'hands on' experience on locations and in the cutting room. Next I spent five years as an assistant with a small but highly professional documentary film company, winner of many awards, Ronald H Riley and Associates Ltd. In 1973, I came to BBC Wales, where I must confess I found professional standards a lot lower than those to which I had become accustomed. It's nice to report that fifteen years later they've caught up quite a lot.

There has been one common cry from the cutting rooms throughout my career - "Make sure the sound recordist gets plenty of WTFX". When Richard offered the editors at BBC Wales the opportunity to state what exactly it is that film editors want from sound recordists, the challenge was just too tempting to resist. So here goes - a 'wingeing' film editor has his say; not, I hope, just to moan, but to offer a little advice or rather to request a little help.

WTFX atmospheres

Why do we want WTFX? After all, the scene was shot all sync sound. Well, with the best will in the world, and despite the sound recordist's supreme efforts, sound does vary from take to take, especially the backgrounds as the mic direction changes. What might be just a murmur looking left to right, becomes a roar of traffic, or rustling leaves when looking right to left. Unwanted noise will be worse if the location manager, director or producer is determined to use a site just off a major trunk road, by railway marshalling yards or under some beautiful trees in full foliage. What was a peaceful scene when we visited it on Sunday turns out to be a cacophony of 20th century noises, and the stillness of the Sabbath is broken on Monday by a breeze, or even a storm force gale. So the director says this is the spot!

Given this situation, what would I suggest, besides a re-shoot? Not less than four separate WTFX atmospheres, more if there are more than 2-4 characters, one from each character's point of view in the direction the mic faced when shooting each actor or actors, one wide perspective atmosphere and one close perspective.

Would I like a WT of all the dialogue to chinese sync it all? Personally no. I find that lines tend to be delivered at different speeds and emphasis, and there's the odd ad lib or word left out. In a recent film with the wind in the trees scenario, I successfully chinese synced one actor's lips to the feed lines on the other actor's takes, cutting in the odd reaction from the latter when delivery or words changed. We were lucky; it's not often that feed lines are of sufficient quality to be able to do this. If the worst comes to the worst, the actors will have to be summoned to a post sync studio to speak their lines to their picture with a sound feed coming over cans. To make the whole thing finally plausible, of course, we'll need the best of the WTFX atmosses for background.

In the quietest room

And what about internal locations? Here, I've found almost no sound recordist will shoot a 'buzz' track. Even in the quietest room, you'd be

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➡ amazed at how external sound can filter in and subtly change the background atmosphere on each take. And what about air conditioners, fluorescent lights, radiators and so on? If possible they should be turned off, unless you are using WTFX atmosses.

Moreover, if everything was perfect on location, that is no motorways, jets, dogs or cats, distant trains or whatever, do we still need WTFX atmosses? After all it was all shot sync! However, sometimes, sync states are not enough to give the location that authentic sound. It may have sounded OK when shooting but later it's lacklustre. Some additional background sound can work wonders, oddments we can get from Library, the sound of kids playing in the yard of that school you can just see up the road, a few more footsteps for the shopping precinct. But there's no real substitute for location sound. What library has that San Francisco street car you didn't record, or the call of the purple headed humped back toad in Timbucktoo, the one that Ludwig Koch didn't record and you didn't either. Maybe Ludwig did get it but it's usually pretty scratchy by today's standards!

Browbeaten sound recordists

Should the sound recordist be browbeaten into shirking his responsibilities because an incompetant cameraman or director is anxious to get on? Should the picture content be compromised so that the sound recordist can do his job properly? Since 'The Jazz Singer', I would regard the sound recordist's contribution as one of equal importance to that of the cameraman. Professional sound recordists are not just there to record sound when asked to. So when the cameraman or the director is talking, shouldn't you tell them, very firmly, to shut it! Recently, one of our recordists made himself very unpopular with a crew because he insisted on doing his job properly, even objecting strongly to a location, because the noise of the wind would make for poor sound quality. I have to say, he was very popular in the cutting room as we had 95% of all the WTFX and atmosses that we needed and were able to disguise others for use in similar locations.

Step forward Bob Allen

The best sound recordist that I have ever met is Robert Allen. Prepare to blush Bob if you are reading this. At the request of the director on two of RHR's documentaries, one on aluminium extensions for HDA and another on 24 hours in the life of a local hospital (shot 90% cinema verite), Bob got general atmosses in various perspectives of every location; and in the various factory shops or hospital locations, he got sound FX for every machine working at that time. And these were low budget productions for a company already working on narrow margins. Were every recordist like Robert Allen, track laying would be a joy, and what tracks we would be able to achieve!

In answer to the question, 'how should WTFX be presented?' - all of Bob's WTFX were clearly front announced and written legibly on his sheet stage boxes.There were no garbled back end announcements identified only by slate number which cause so many problems and waste a lot of valuable syncing up time. This should be the regular working practice of a sound recordist.

I can hear the cry of - 'here's another griping editor, who sits in his cosy room, working regular hours - he doesn't know what it's really like.' Well, I too have stood for three hours in a field in industrial Lancashire, on a rainy, windy February day, waiting for a small industrial train to pass so that the cameraman could get the right shot. I have stood frozen to the marrow on an ice-covered building site in Copenhagen for days shooting a new system of building for training purposes, when it was ten degrees below. I have worked through meal breaks and late into the night, sometimes with unwilling members of the public, who hadn't realised just how long it takes to shoot a scene. I have approached a transmission deadline, the track laying suspended, while we tried to piece together the beginnings and ends of sync takes to get enough sound to make a runable loop from which we could get an atmosphere track.

The cameraman and recordist do their work, but what the public sees is what the film editor (with or without the director or even the script) has done with it. However, although ultimately the power is in our hands, we need the raw materials to make a success of the film. Reviews of a film may praise the camera work or the sound recording, but if it is a flop, the editing is often blamed. Editing is a satisfying craft and few of us would swap the thrill of seeing a film come together for anything. But to do this, we need your help! ❐

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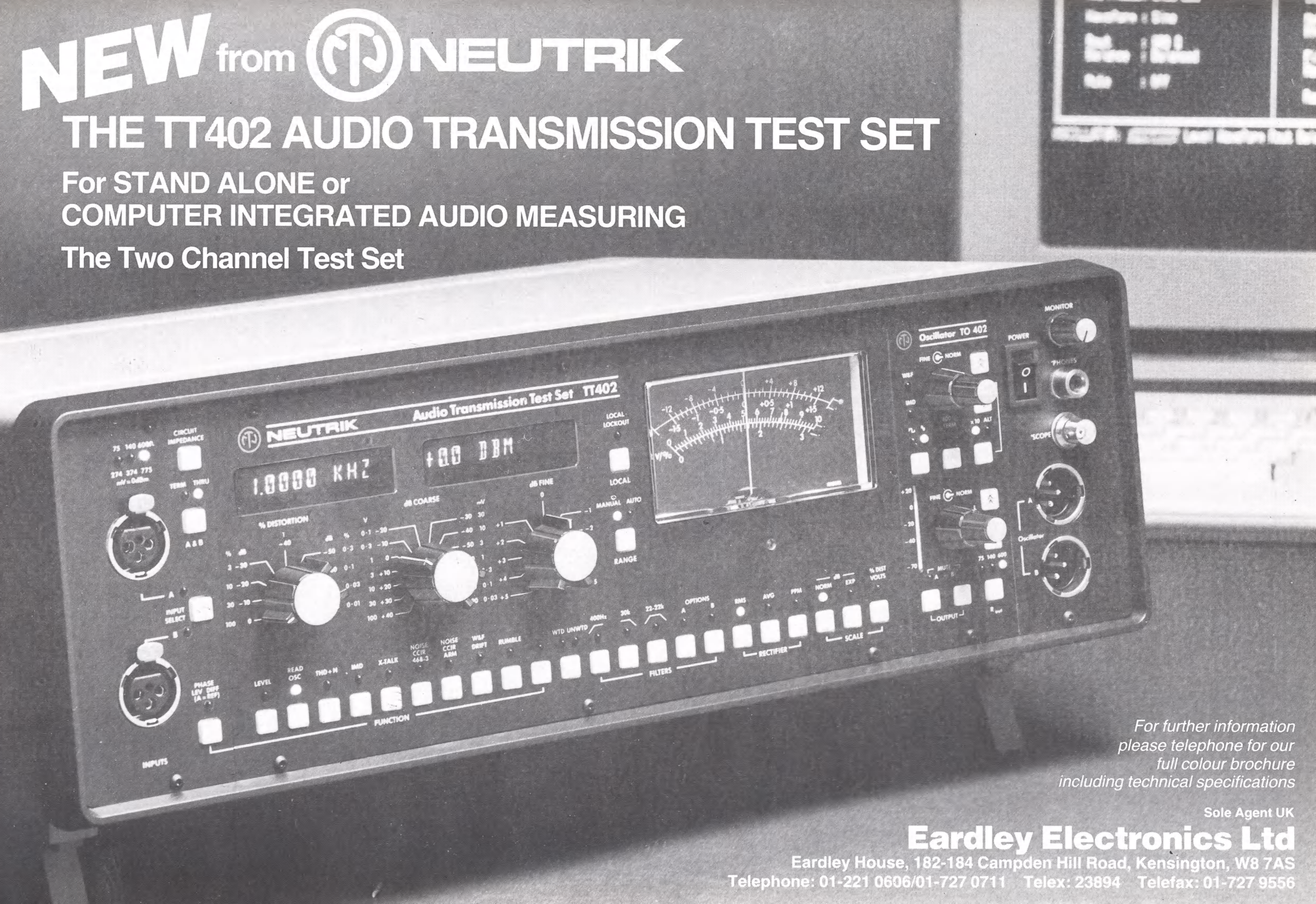

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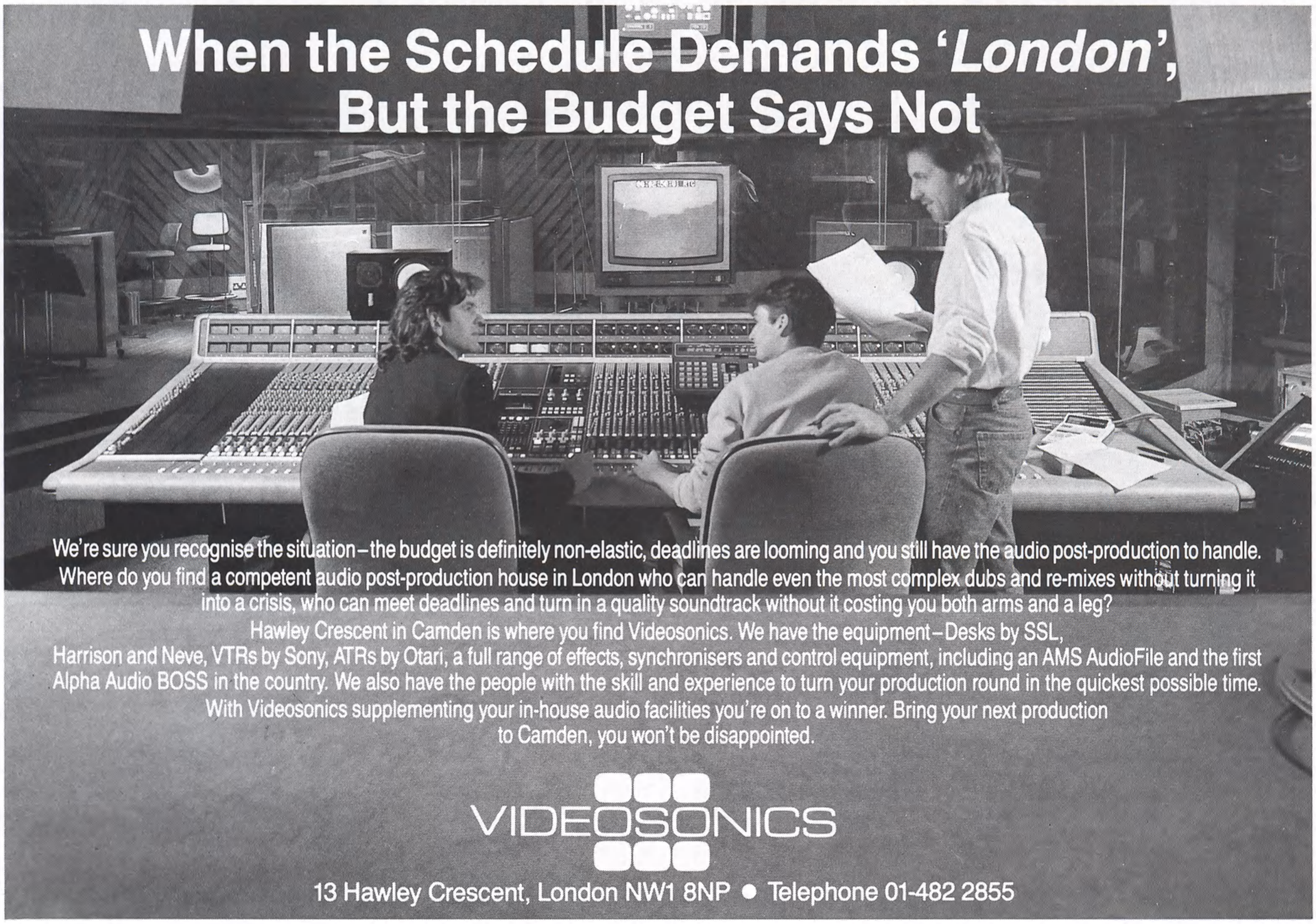

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AIR CHECK

A regular commentary by
Norman McLeod

At 4pm on Friday, 22 July 1988, I did something no-one has been able to do, outside the BBC or the IBA, since time began. I switched on an FM broadcast radio transmitter in the UK without fear of prosecution, under a licence from the Broadcasting Department of the Home Office.

The location was Southmere Park, Thamesmead, and the occasion was the weekend of the Thamesmead show. For 48 hours continuously between 7pm on the Friday until the same time on Sunday, Radio Thamesmead was able to break free of the restrictions of the antiquated cable system which is normally the station's only outlet, and present programmes over the air on 104.3 MHz from a temporary transmitting station delivering just one watt.

This provided us with an opportunity to evaluate many aspects of smallscale FM radio which had previously only been the subject of theoretical speculation. My main concern was a technical one: just how effective are low-power FM transmitters in urban areas?

My responsibility at this event started at the point where the line from the studio - fitted into a double decker bus in the middle of the park - entered Wireless Workshop's transmitting caravan, which was perched on a ridge overlooking Southmere lake. I quickly realised that we needed the vast gain riding range of an Orban Co-operator compressor and HF limiter, which I had taken along for trial.

This was because the level of signal coming from the studio was varying by as much as 20dB between items and operators. I used both sections of the Co-operator in series with each other (the broadcast being in mono), to achieve not only deep and effective compression, but also HF lift and limiting (akin to de-essing) at 150µS in the first section, and 50µS in the second.

The 150µS lift was partially cancelled by a 100µS de-emphasis network connected between the Co-operator and the transmitter, while the 50µS lift in the second section matched the normal 50µS de-emphasis in FM receivers. The net effect was to produce a mild and slow HF boost, together with heavy HF limiting in two consecutive stages, in order to restrain the tendency of FM broadcasting towards sibilance under adverse reception conditions.

The peak possible deviation of the transmitter fell - by virtue of the 100µS network - at 6dB/octave from a -3dB point around 1.5kHz. Tonally, this resulted in a more mellow, much less 'fizzy' sound than most FM stations heard elsewhere along the dial. An FM tuner, Quad 303 amplifier and Rogers LS3/5A loudspeaker were used for quality assessment, together with an oscilloscope to monitor peak deviation levels.

The action of the compressor was to reduce the range of transmitted modulation peaks to less than 4dB. I make no apology for this, though many members of the Institute might cringe at the prospect of a 5:1 compression ratio starting 20dB below line level. Broadcasts like this have to be intelligible at all times on radio receivers which themselves have only very limited dynamic range capabilities. To release the output from Radio Thamesmead's studio unchecked would have made the proceedings almost impossible to listen to without the need to adjust the volume of the receiver time and time again.

Although the weather was very windy and unsettled, I was able to dodge the downpours for long enough to cover 32km of roads in the area on my bicycle, listening on headphones to a representative small portable FM radio, and grading reception quality on a five- point scale, from Grade 5 (excellent), through 4 (good), 3 (usable), 2 (poor) and 1 (just identifiable).

Thamesmead is a very flat place, so that although the transmitting aerial was barely 8m above ground (owing to the high winds we did not think it prudent to extend the mast to the full permitted height) and even less than that above sea level, reception at Grade 4 or above was obtained almost everywhere within a 2km radius of the transmitter.

So what is the programming potential of community stations like Radio Thamesmead? Community radio stations - as a matter of principle rather than as a public relations exercise - open their doors to volunteers and local groups who would never get the time of day from glossy commercial stations.

On first hearing, what struck me most was the variability and range of the output; one gets so used to tightly 'formatted' stations which sound exactly the same all the time. Listening to a service which broadcasts different programmes every couple of hours was a welcome change.

The programming ranged from the sublime to the ridiculous via the tedious; rather like BBC local radio, but without the restraints - both good and bad - of career-minded professionalism. I'd certainly like to hear many more such people have a go at broadcasting in the run-up to the Radio Authority. What better way to get the measure of new broadcasters than by allowing them to do some broadcasting. ❐

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Blumlein *looking at* stereo

One man, responsible for pioneering much of what we take for granted today in audio engineering, decided in the 1930's to bring together disc and film technologies in a series of experiments that were to have an enormous significance decades later. Mark Yonge looks back on the early explorations of Alan Dower Blumlein.

In the early 1930s, Alan Blumlein undertook a comprehensive exploration of a concept for three-dimensional perception of sound. It was called Stereophony. At this time, he was working with the EMI research laboratories in Hayes, near London. Previously, he had worked with Western Electric and then Columbia Gramophone Company investigating methods for disc cutting and microphone design. Having spent a considerable amount of time developing and improving a new method for recording sound onto disc, he set about exploring the possibilities for including additional information in the disc groove to communicate sound direction as well as intensity and range.

His concept ran counter to that adopted by Bell Laboratories in the USA who were experimenting with arrays of microphones feeding an array of loudspeakers. Blumlein felt that human hearing, based on two ears, must be capable of resolving satisfactory stereo images using a simpler arrangement based on the difference in amplitude and phase of sounds reaching the two ears. Through some of the earliest psychoacoustic work, he determined that directional information at low frequencies is established by the relative phase of sounds arriving at the two ears, while above about 700Hz, the phase effect became less important than the relative level. His early tests used a pair of omnidirectional microphones separated by a head-sized baffle to simulate real stereo hearing. Later, directional microphones were used. The culmination of this work was the publication, in 1933, of a most comprehensive patent, number 394,325, which, in a series of 70 wide ranging claims, laid the groundwork for practical stereo work for decades to come. Ironically, the commercial use of his theories was not possible until nearly thirty years later, by which time the patents had expired - EMI didn't make a penny from his work!

The stereo discs that resulted from his work during this period are well known, some of them have even been transferred to new recordings for public distribution. Less well-known are the films that were made with stereo soundtracks during this period.

Stereo Sound on Film

In 1935, a series of tests took place in which a modified 35mm camera, fitted with two specially designed sound modulators, was used to record a series of scenes with stereo sound. Working with a fixed focal-length lens he was able to show a sound image together with its visual counterpart. This film recently came to light after fifty years in EMI's vaults and, through the efforts of Norman Green of the ITV Association, was transferred from the inflammable nitrate-based original to modern acetate-based safety film stock. Parts of it were seen for the first time at a theatrical screening in February and during the AES Sound with Pictures Symposium in May this year.

The soundtrack itself is quite remarkable despite the limitations of the technology at the time. It comprises two 'unilateral' variable area soundtracks (one edge modulated) recorded side by side in approximately the same space as would be used for a standard mono track. The density of the soundtrack (how opaque the dark parts are relative to the transparent area) is very low, largely determined by the picture density. A technique for re-developing just the soundtrack area after picture development in the chemical bath was not introduced until later years, when it became necessary to cope with the complexities of colour film processes. The level of

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The Institute of Broadcast Sound is a professional body serving those who are responsible for the sound transmitted on radio and television in the UK and Eire. The IBS was set up in 1977 to meet a long-felt need for a better interchange of ideas and techniques between practitioners in the various areas of broadcast sound. To this end, the Institute holds regular meetings and discussions on matters of common interest, runs residential weekend seminars and arranges visits to manufacturers and studios.

Acting as a clearing house for the exchange of ideas on the practice of sound broadcasting, the IBS keeps members aware of new developments in equipment design and operational techniques, and encourages them to observe the highest professional standards. This journal, *Line-Up*, assists in these aims by publishing reports of meetings, together with articles contributed by members, specialist writers and manufacturers.

The membership of the Institute is drawn from staff in both independent and BBC radio, television and film departments, as well as those facilities companies working for IBA programme companies or the BBC.

Full Members will normally hold, or have held, a position with responsibility for the sound output of a broadcast production, including planning and post-production where appropriate.

Associate and **Student Membership** is open to all sound staff with current experience in broadcasting. At least five years of broadcasting experience is required for Associate membership, and those with less experience are encouraged to join as Student members and benefit from the training aspects of the Institute.

Associate of the Institute is a special category open to those who would not otherwise be eligible for membership but who would like to be involved with the IBS because their work is closely connected with broadcasting. A growing number of staff in the manufacturing, research and academic fields are joining the Institute in this category, taking full advantage of an unparalleled opportunity to talk directly to the practitioners of broadcast audio.

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Meetings

Most IBS meetings start at 6.30 pm with a buffet and wine. The meeting proper is scheduled to start at 7.30 pm and usually consists of a presentation by the guest speaker(s) followed by questions and discussion.

A nominal charge of £2 is made towards costs at London meetings except for members who have to travel from the regions. One personal guest per member is permitted provided the guest has not attended before (charge £3).

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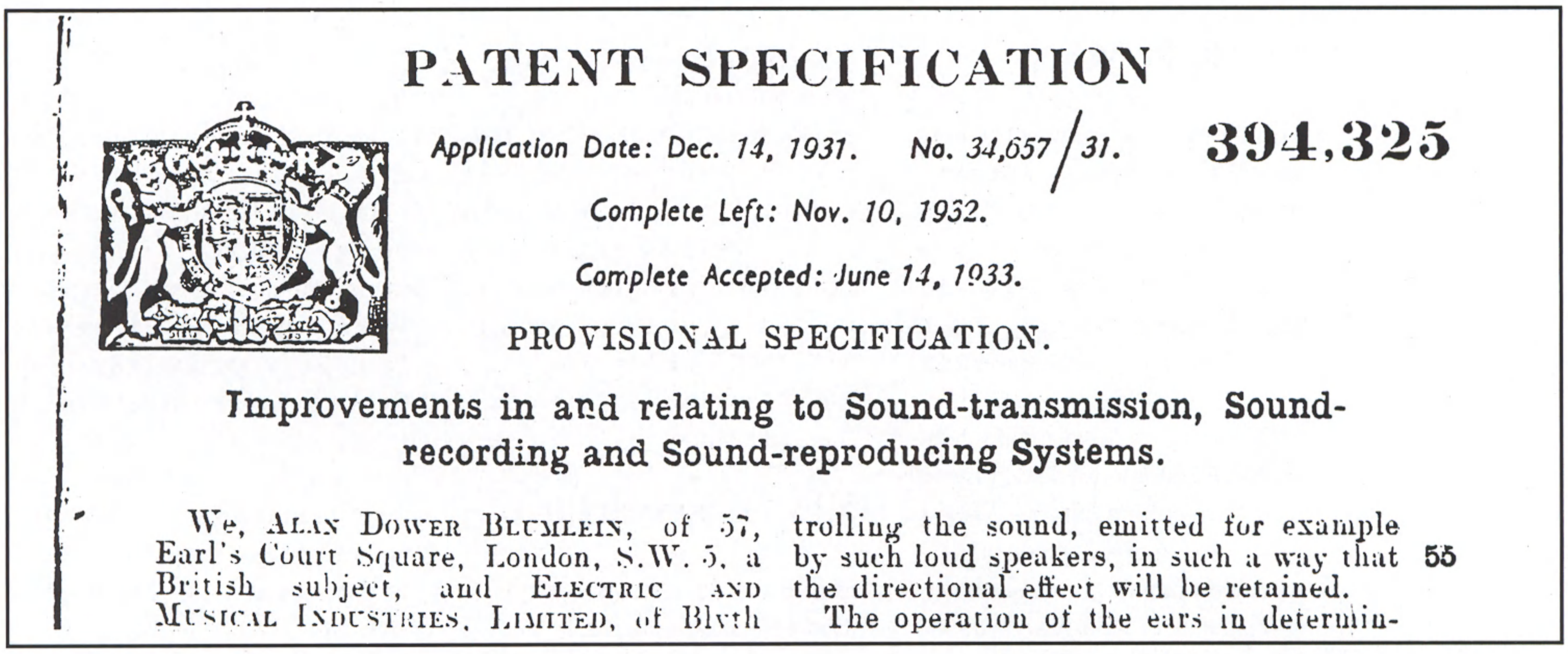

PATENT SPECIFICATION

Application Date: Dec. 14, 1931. No. 34,657/31.

394,325

Complete Left: Nov. 10, 1932.

Complete Accepted: June 14, 1933.

PROVISIONAL SPECIFICATION.

Improvements in and relating to Sound-transmission, Sound-recording and Sound-reproducing Systems.

We, ALAN DOWER BLUMLEIN, of 57, Earl's Court Square, London, S.W. 5, a British subject, and ELECTRIC AND MUSICAL INDUSTRIES, LIMITED, of Blyth

trolling the sound, emitted for example by such loud speakers, in such a way that the directional effect will be retained.

The operation of the ears in determin-

Blumlein's patent - laid the groundwork for decades of stereo development

➡ modulation on the track is also very low, both factors leading to a very noisy reproduction. Despite these technical limitations, it was wonderful to see and hear these historical experiments, and snatches of thirties life, in stereo.

These included a sequence of laboratory pieces showing people, obviously technicians drafted in for the occasion, standing at various points across the screen reciting numbers or days of the week, first singly, then together, then moving about. This could have been to demonstrate the workings of the well-known 'cocktail party effect', where speech is detected against a noisy background by virtue of its visual and aural location. It is in one of these 'walking and talking' pieces that we catch a brief glimpse of Alan Blumlein himself walking past the camera.

The effect of a sound source panning across the screen is graphically demonstrated using a cooperative fire engine and a large field. With a fixed point of view, the fire engine makes several passes in front of the camera with its bell ringing furiously. As a final party trick, the film has been cut so that the engine suddenly appears, stationary, in the centre of the screen - the first stereo jump-cut?

For me, the most effective section covers a sequence of shots of trains moving in and out of Hayes station. Photographed from a high vantage point, the camera has a wide view of the station and its surroundings. A number of steam trains are seen crossing the screen in both directions and entering and leaving the station; these would have been the regular commuter trains of the time. Various microphone positions are used, perhaps to demonstrate the effect of distance on the distribution of the stereo stage. These recordings, not surprisingly, give the clearest indication of stereo position and reproduce remarkably well, but some odd effects prompt speculation. One piece showing a fast train passing is clearly showing excessive interference. The sound intermittently disappears as if the microphones he was using (most likely to have been ribbon-type velocity microphones) were suffering from the ribbon being out of their magnetic field entirely!

The last sequence of all is the culmination of Blumlein's experiments in 'sound pictures' as he called them. A group of amateur players are assembled to form a playlet; a simple scene in a pub where people attempt to order drinks from an incompetent and boorish waiter. The whole is managed on a single frontal shot and the stereo placement works well. At one point, a lady customer complains about the band (out of shot) which the head waiter thoughtfully waves to the other side of the stage as if by magic - I wonder who got the job of carrying the gramophone!

The nature of these pieces seems to indicate that Blumlein sought to establish a direct correlation between his sound pictures and the photographic evidence of the visual reality. He never made any other sound films as far as I know, and his equipment was later lost. His interest moved on to other projects such as the 405-line television system, then in its infancy and, after the outbreak of war, radar. He was killed in 1942 on a routine flight whilst testing an experimental airbourne radar system.

Although systematically very similar, modern 35mm films with combined stereo optical soundtracks are produced in quite different ways. Stereo sound images tend to be built up from a variety of mono and stereo sound source elements rather than relying on a single stereo microphone to capture the whole image with its perspective and location information, an inflexible process that would tend to hamper a production shoot enormously!

Nevertheless, we owe an enormous debt to a man both farsighted and practical enough to have put advanced theories into practice at a time when others were struggling with the basic elements of sound engineering.

Alan Blumein was finding answers before others understood the questions.

❐

NEW PRODUCTS

Fairlight MFX

Stirling Audio Systems introduced the MFX, a dedicated audio post production console for the Fairlight series III, which was shown for the first time in the UK at APRS, and according to the company, attracted immediate interest from broadcast and post production houses. The MFX Fairlight allows manipulation of stored and imported sounds, with waveform editing, mixing, filtering, envelope, flanging, resynthesis, waveform drawing, cross-fading, reversing and looping, all available via the VDU. The MFX also interfaces with Lynx and many other synchronisers.

With storage on up to eight 380Mb high speed hard disks in a single system, the Fairlight MFX can provide more than seven hours of 48K mono sound. With the cue list sequencer, up to 15 separate event decision lists are available, each consisting of as many as 256 events.

Thirty simultaneous events can be spread over 16 audio outputs, while volume automation with graphic input, doppler effects, fades, and pitch changes over time are all available. System commands can be cued to SMPTE allowing further EDLs to be loaded from hard disk which, with the multi-tasking capabilities of the MFX, provide Fairlight users with unlimited event cuing capabilities.

Kintek convertor

Stirling Audio Systems also distribute the new Kintek KT-904 Stereophonic Convertor, which, with the advent of stereo television, has been developed to solve many of the problems faced by broadcasters working in stereo. The Kintek KT-904 is a modular, 19" rack mounting unit which enables tv and radio stations to transmit in full stereo, whether their programme material is mono or stereo. The (L & R) sum signal is untreated in order to retain maximum stereo compatibility.

The KT-904 uses 'intelligent' speech recognition circuitry which leaves dialogue centralised and 'unspread', while retaining ambient sound on a wider stage. As a result, the viewer perceives a more realistic interpretation of screen dialogue. With Kintek's Monogard Reverse Polarity Detector, reversed polarity feeds are converted automatically to eliminate sound loss on mono receivers or stereo mis-imaging on stereo transmissions. The KT-904 will be on show in the UK at IBC, on the Stirling Audio Systems stand.

Stirling Audio Systems, Kimberley Road, London NW6. Tel: 01 624 6000

New Beyer mic for SBES

At this year's SBES, Beyer will have on show their brand new electret gun mic, the MCE86. This mic is lightwight, has Phantom

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Powering (10-50V), and a 1.5 volt battery version is also available for field production work where powering is difficult. The M561 is a broadcast quality headset mic for sports and news commentators, and is also suitable for dubbing purposes.

Also new at SBES, will be the new-look all black DT108 and DT109 mic/headphone combinations, which have been specially designed for maintaining a low vision profile on camera.

Beyer Dynamic, Unit 14, Cliffe Industrial Estate, Lewes, Sussex BN8 6JL. Tel: (0273) 479411

Orban mic processor

Orban recently announced the availability of the new Model 787A programmable mic processor, which is designed for mic- or line- level applications where the ability to store and recall processing can increase efficiency and provide a consistent result.

The 787A features a three-band 'constant-Q' parametric equaliser, compressor with adjustable release time, de-esser, noise gate and/or compressor gate and effects send and return ports, all of which are integrated into a two rack system.

Complete control setups can be stored in 99 memory registers through easy keystroke sequences for instantaneous recall. Easy-to-read bargraph displays indicate gain reduction and peak output levels. A numeric display indicates the current setting of a selected parameter.

Moreover, to prevent unauthorised tampering with pre-sets, a security code locks programming controls. A central Z-80 microprocessor with power line monitoring capability assures reliable operation and protection of memory contents.

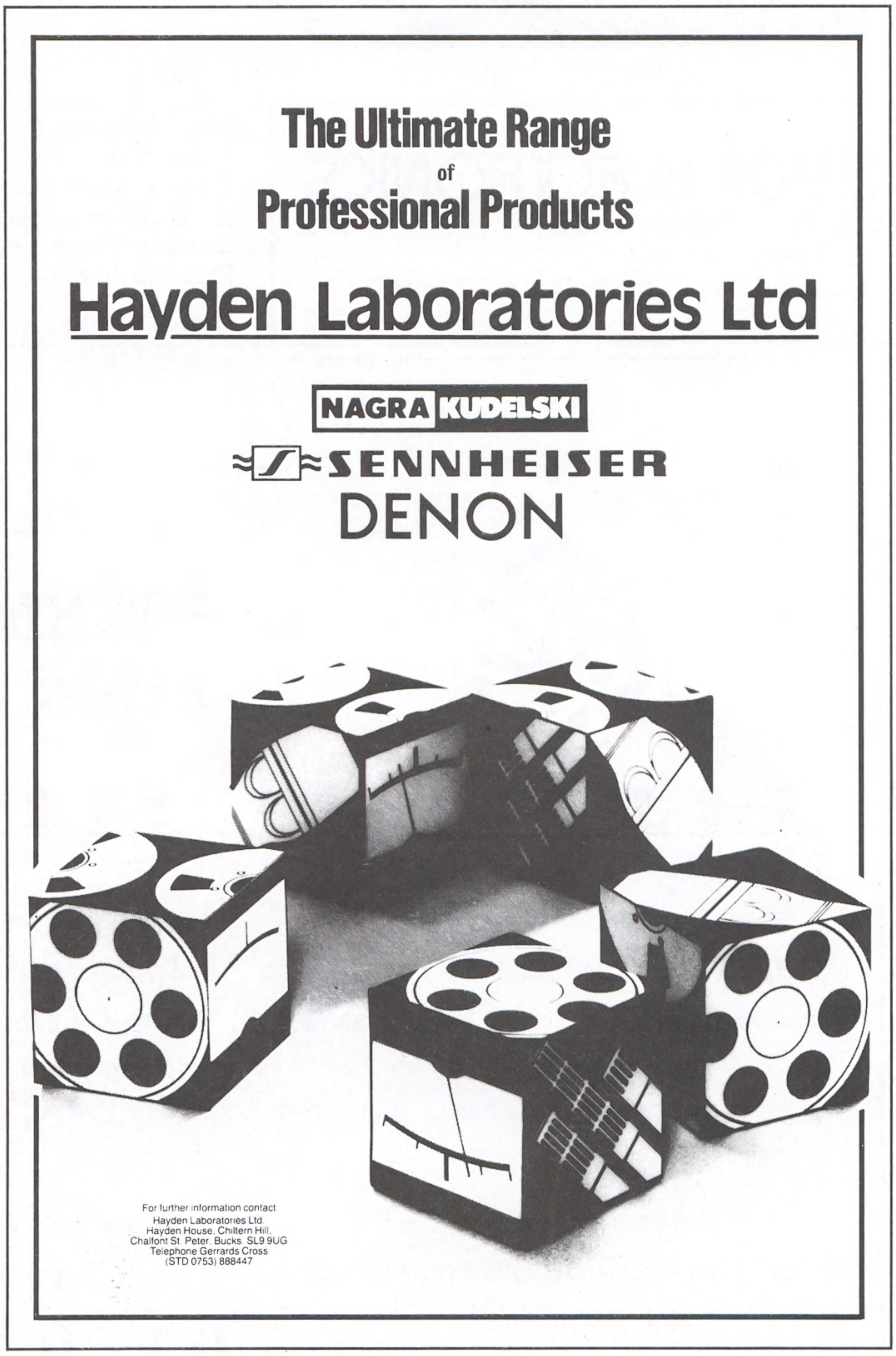
The 787A offers a line-level input as standard, while a Jensen transformer mic preamp with 48-volt phantom power is optional. Remote programme-stepping by external contact closure is provided, and also available are MIDI or RS-232 interfaces, a console-mounted Basic Remote Control accessory with numeric display and an optional second-channel slave unit (787A/SL) for dual-mono or stereo operation.

Orban Associates Inc., 645 Bryant Street, San Fransisco, CA 94107, USA. Tel: (415) 957 1067

New dynamics processor

Focusrite have launched a new dynamics processor, the ISA 130. The unit is made up of a compressor/limiter, noise gate/expander and de-esser/exciter. Individual high and low pass filters, together with a peaking mid range equaliser are provided. Each of these controls may be independently assigned to compressor

➡



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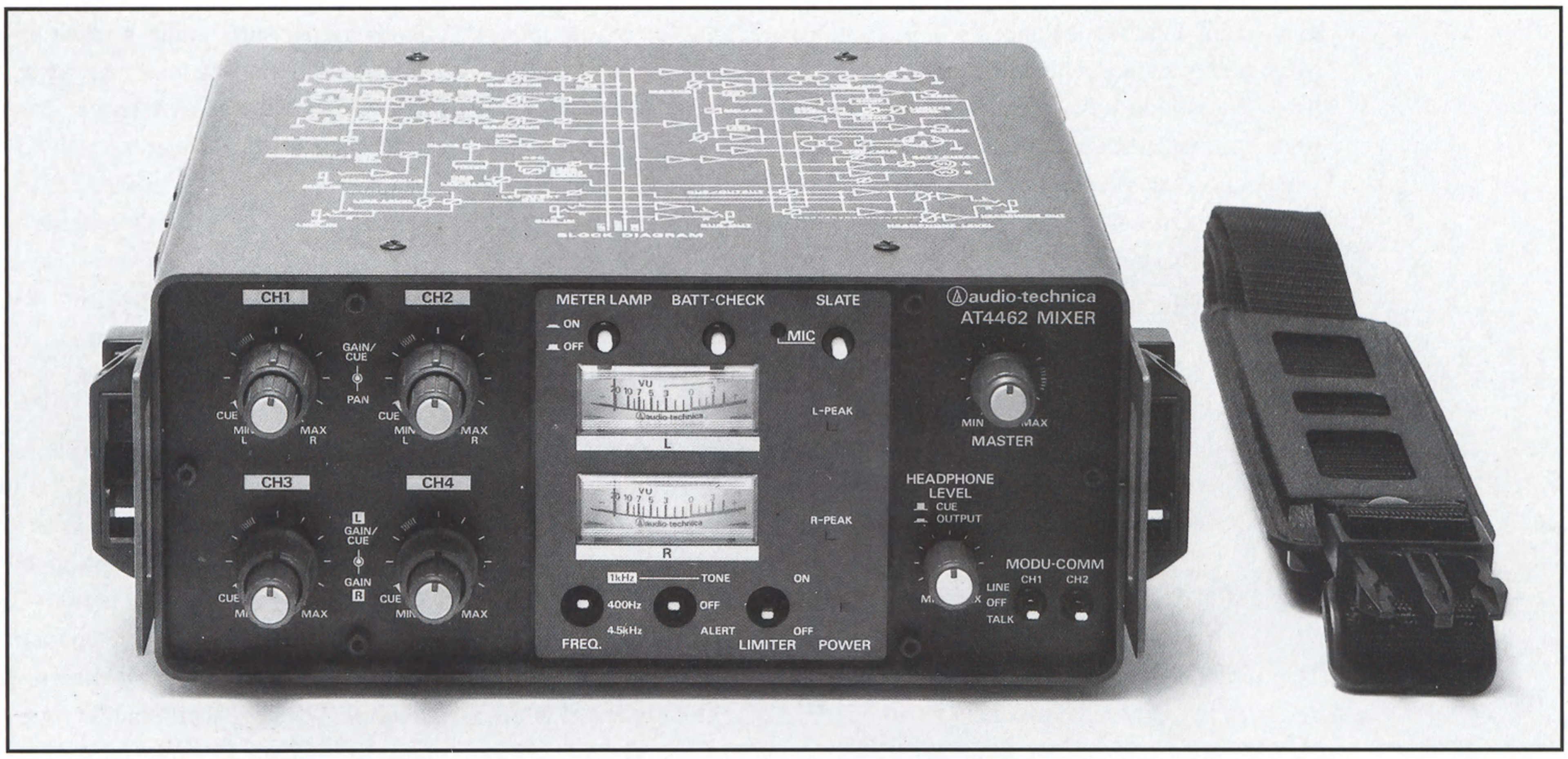


Audio Technica 4462 mixer

➡ sidechain, gate sidechain or audio signal path.

At the heart of the ISA 130, a new VCA (Voltage Controlled Amplifier) design features exceptionally low distortion, accurate and thermally stable control characteristics, and the absense of modulation noise achieved through a class A geometry.

Focusrite Ltd, The Old School,
Wooditton, Newmarket, Suffolk
CB8 9RY. Tel: (0638) 730696

Audio Technica field mixer

Audio Technica UK have recently announced the appointment of Audio Systems Components (ASC) as UK distributor for the new AT-4462 Field Production Mixer. The mixer is a battery-portable, four channel stereo mixer with integral limiter and multi-frequency tone oscillator. The unit features AT's own 'Modu-Comm' system which allows talkback (using optional adapter) back down the mic cable even while in use. Thus, if the Modu-Comm is fitted, then talkback is automatically available with the mic inputs.

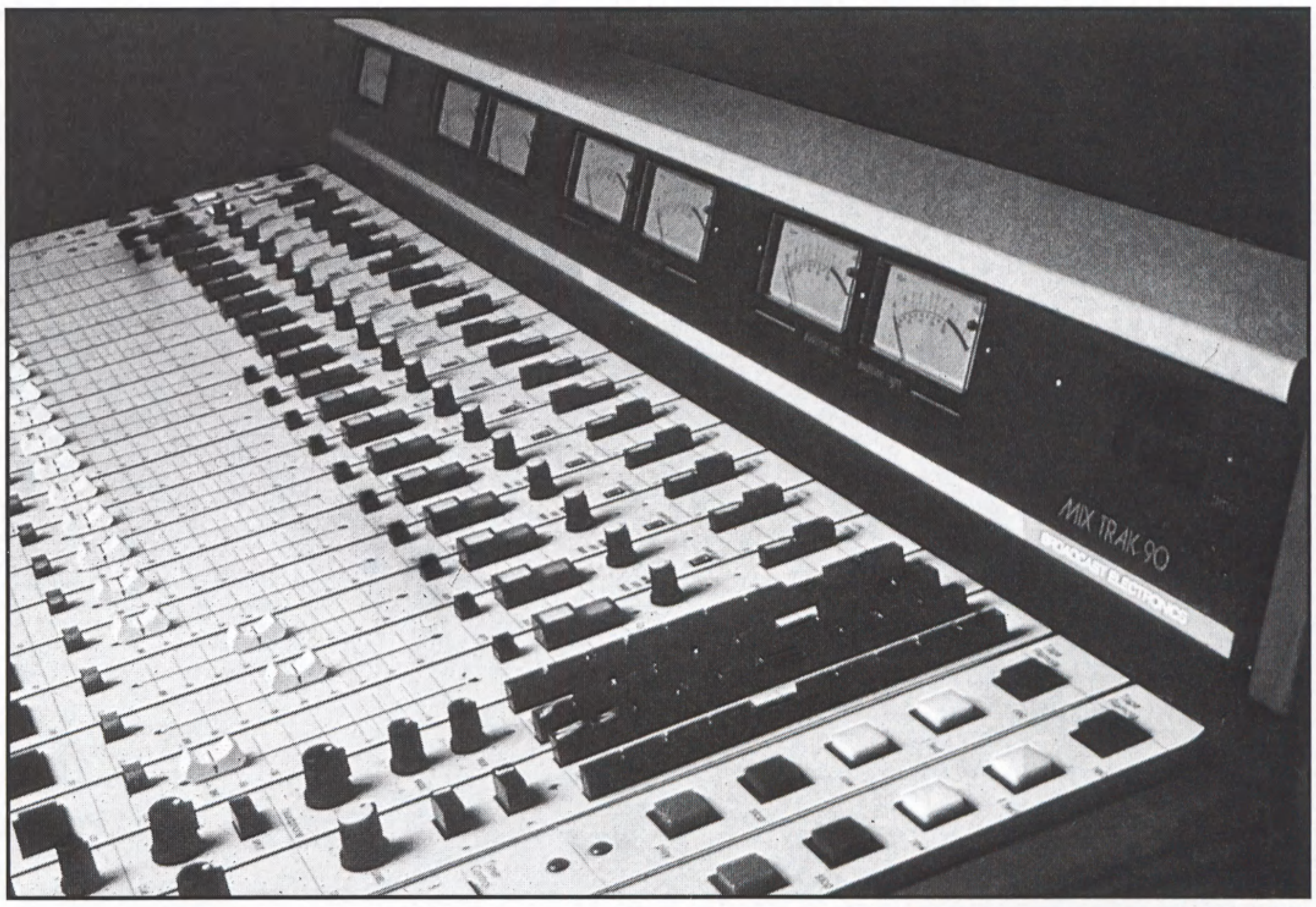
In addition, the AT-4462 stereo inputs are genuine left/right stereo inputs with XLR connectors, so that the unit could handle six mono inputs, two being pannable left/right. Len Lewis of ASC comments, " The AT-4462 is the ideal 'big brother' to our three channel mono Minx mixer. Both units are small but have comprehensive facilities, which means more stories can be covered ... using the one box, a welcome economy."

Audio Technica, Technica House,
Lockwood Close, Leeds LS11 5UU.
Tel: (0532) 771441

Broadcast Electronics on-air

Broadcast Electronics has entered the modular, on-air console market, with the introduction of the Mix Trak 90 on-air console. The company allege that the console offers 'the versatility of advanced modular engineering and the flexibility to grow with a station's operation.'

It comes in a 12 or 18 channel mainframe and offers 14 auxiliary modules. Features include complete VCA audio control, Penny and Giles linear faders, Hall Effect switching, monitor ➡



Broadcast Electronics Mix Trak 90

➡ 'dim' function, balanced patch points and individual mic and line input modules. Another feature is an Automatic Source Sequencer, which allows an operator to programme a series of events and to automatically activate them with a single switch.

Broadcast Electronics, 4100 N. 24th Street, PO Box 3606, Quincy, IL 62305-3606, USA. Tel: (217) 224 9600

API console

The Model 4032, a new console designed by API Audio products Inc., Virginia, USA, is the first new API console to be built in five years. The console, which is fully automated with a European-made Audio Kinetics master mix disk-based animation system, has 48 inputs with 32 channel monitoring, and up to 14 effect sends per channel, eight of which can be made into four separate stereo pairs. The monitor section is completely separate with two stereo cues or four mono cues. It has a 600 point 1/2" patch bay and four separate headphone mixes.

This new API console was custom designed to be versatile and to accommodate a variety of musical sounds and situations. It has all discrete circuitry, but it utilises both the classic API 2520 op amp with iron core transformer and the Hardy 990 op amp with Jensen nickle core transformer. This allows for various choices of routing for different tonal (sound) qualities.

API Audio Products Inc., 7951, Twist Lane, Springfield, Virginia 22153, USA. Tel: (703) 455 8188

McCurdy Radio intercom

McCurdy Radio have introduced the CS9400+ digitally controlled intercom system. The company claim that the system is the only intercom available that has totally dynamic capabilities. The CS9400+ has an exclusive dynamic status readout of all matrix functions, with no read or file transfer required. Moreover, instantaneous reconfiguration of the entire system set-up is possible to meet a variety of production needs either from a floppy disk or a Winchester hard disk drive. Its building block concept allows expansion of the system as the user's requirements grow.

Features of the system include point-to-point communications, 80 dynamic programmable party lines (PL), 80 programmable interrupted fold backs (IFB), two-way radio interface, common carrier telephone interfaces and auxiliary equipment control. The keypanels contain user-defined 4-character high speed memory mapped alpha-numeric labels per destination, a unique caller identification and reply system, and talk and listen keys can be programmed locally for point-to-point, PL, all call, IFB and so on.

McCurdy Radio Industries Ltd, 108 Carnsorch Road, Toronto, Ontario, Canada. Tel: (416) 751 6262 ❐

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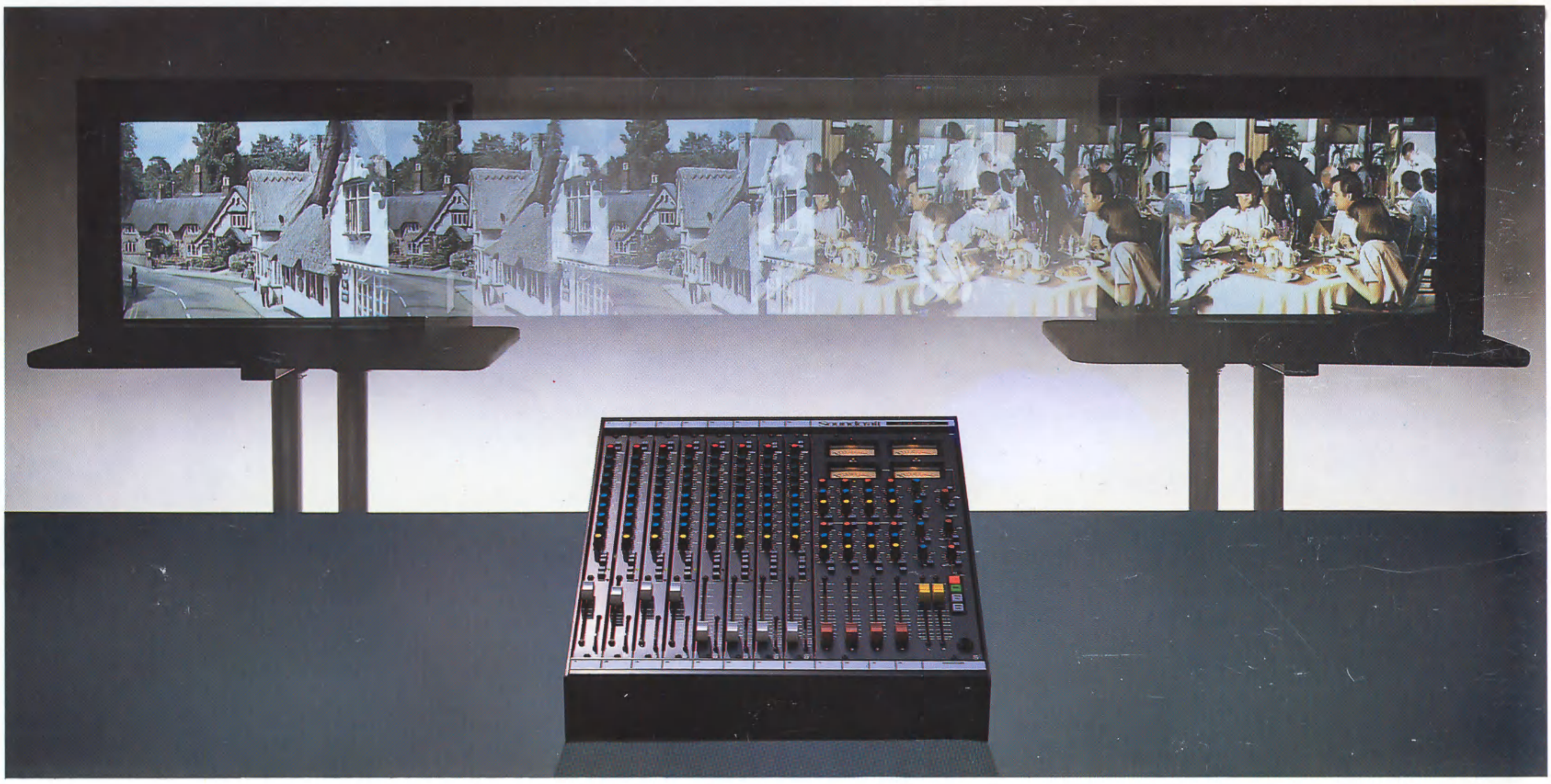

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What's more, since it's a universal interface, you get this remarkable freedom with virtually any editor.

Of course, if your need is purely for audio-follow-video, the 200 BVE's standard parallel interface and VCA faders give you total editing accuracy.

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